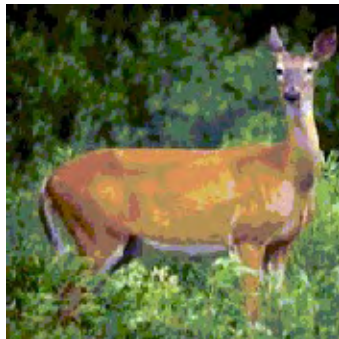
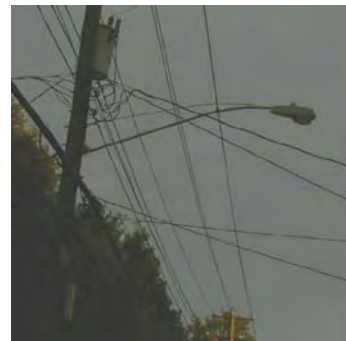


Annual Report on the **ENVIRONMENT**



2005



Fairfax County, Virginia
Environmental Quality Advisory Council



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ANNUAL REPORT
on the
ENVIRONMENT
2005



Fairfax County, Virginia
Environmental Quality Advisory Council

Printed on recycled paper

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INTRODUCTION

This year's Annual Report on the Environment has been prepared by the Environmental Quality Advisory Council (EQAC). Staff support for the coordination and printing of the Report has been provided by the Planning Division of the Department of Planning and Zoning.

The Annual Report on the Environment, which is an update on the state of the County's environment, serves a threefold purpose. Initially, it is intended to assist the Board of Supervisors in evaluating ongoing environmental programs and to provide the basis for proposing new programs. The document also aids public agencies in coordinating programs to jointly address environmental issues. In addition, the report is directed to citizens who are concerned with environmental issues.

The Report contains chapters on major environmental topics including: land use and transportation; air quality; water resources; solid waste; hazardous materials; ecological resources; wildlife management; and noise, light, and visual pollution. Within each chapter are: a discussion of environmental issues; a summary of relevant data; and a discussion of applicable government programs. Where relevant, discussions of legislative issues are provided. Most of the chapters conclude with recommendations that identify additional actions that EQAC believes are necessary to address environmental issues.

This report covers activities affecting the environment in 2004; however, in some cases, key activities from 2005 are also included.

While the Environmental Quality Advisory Council has prepared and is responsible for this Report, contributions were made by numerous organizations. Many of the summaries provided within this report were taken verbatim from materials provided by these organizations. EQAC therefore extends its appreciation to the following organizations:

Audubon Naturalist Society
Clean Fairfax Council, Inc.
Coalition for Smarter Growth
Fairfax County Deer Management Committee
Fairfax County Department of Health
Fairfax County Department of Systems Management for Human Services
Fairfax County Department of Planning and Zoning
Fairfax County Department of Public Works and Environmental Services
Fairfax County Department of Transportation
Fairfax County Executive's Office
Fairfax County Environmental Coordinator
Fairfax County Fire and Rescue Department
Fairfax County Non-Motorized Transportation (Trails) Committee
Fairfax County Park Authority
Fairfax County Police Department, Division of Animal Services
Fairfax Joint Local Emergency Planning Committee
Fairfax ReLeaf
Fairfax Water
Federal Aviation Administration
George Mason University, Departments of Biology and Environmental Science
and Policy
Illuminating Engineering Society of North America
International Dark-Sky Association

Interstate Commission on the Potomac River Basin
McLean Conservancy
Metropolitan Washington Airports Authority (MWAA)
Metropolitan Washington Council of Governments (COG)
National Park Service
Natural Resources Conservation Service
Northern Virginia Conservation Trust
Northern Virginia Regional Commission
Northern Virginia Regional Park Authority
Northern Virginia Soil and Water Conservation District
Potomac Conservancy
Reston Association
The Nature Conservancy
United States Army Corps of Engineers
United States Centers for Disease Control and Prevention
United States Geological Survey
Upper Occoquan Sewage Authority
Virginia Department of Conservation and Recreation
Virginia Department of Forestry
Virginia Department of Game and Inland Fisheries
Virginia Department of Environmental Quality
Virginia Department of Transportation
Virginia Outdoor Lighting Taskforce
Virginia Outdoors Foundation

In addition, EQAC wishes to acknowledge the efforts of the County's interagency Environmental Coordinating Committee, which coordinated the staff responses to the recommendations within EQAC's 2004 *Annual Report on the Environment*.



County of Fairfax, Virginia

To protect and enrich the quality of life for the people, neighborhoods and diverse communities of Fairfax County

Board of Supervisors
County of Fairfax
12000 Government Center Parkway
Fairfax, VA 22035

December 5, 2005

Chairman Connolly and Members of the Board:

EQAC is pleased to present the 2005 Annual Report on the Environment. In this report, we discuss various environmental issues in Fairfax County and make recommendations as to what actions the county should take to resolve identified problems. The Report consists of eight chapters – each chapter addressing a different aspect of the environment. Again this year the chapters are rearranged to reflect the order of topics listed in the newly adopted environmental vision for Fairfax County.

EQAC thanks the Board for adoption of the *Environmental Excellence for Fairfax: A 20-Year Vision* last year and is especially pleased with the follow-up implementation plan *Fiscal 2007 Environmental Improvement Program*.

We find that every year, Fairfax County's programs continue to improve and advance in their efforts at environmental stewardship.

Since the late 1990s, the county has engaged in a progressive and systematic approach to assessing the health of our streams and then moved forward with watershed protection and restoration efforts. The ongoing citizen-based watershed planning efforts for all the streams in Fairfax County are the most recent examples of this program. We want to thank you specifically for the additional funding for Stormwater and Watershed Planning Implementation this last year.

We would also like to thank you for the funding in the amount of \$2.0 million that you provided to support the Environmental Agenda as part of the FY 2004 Carryover Review. This funding supported a range of projects, which have been completed or in the final stage of completion.

We also thank you for the additional \$500,000 that you provided at the FY 2005 Carryover Review to be used for the implementation of critical non-stormwater environmental projects that support the Environmental Agenda. We recognize that the \$2.5 million is in addition to the \$17.9 million that the Board dedicated for

Environmental Quality Advisory Council
c/o Department of Planning and Zoning
12055 Government Center Parkway, Suite 730
Fairfax, Virginia 22035-5509
Phone 703 324-1380
FAX 703 324-3056
www.fairfaxcounty.gov/eqac

Board of Supervisors
Continued

stormwater projects as part of the FY 2006 budget. These funds represent a significant deposit on a long-standing environmental debt in the county.

We again commend the Board for moving forward with a comprehensive agenda for the county on clean air and for adding the position of Air Quality Program Manager back into the budget. We thank you for leading the region in air quality programs by purchasing wind energy, doing diesel retrofits for county connector buses and school buses, for the purchase of hybrid automobiles for county fleets, and for actively promoting the county's telework program.

In addition, the county has passed an outstanding lighting ordinance in recent years that protects the night sky and neighborhoods, and has been working to create guidelines for the county in natural landscaping.

But rather than focusing on a few specific recommendations in this year's report we would like to make some comments on the county's environmental programs as a whole.

All of the above mentioned efforts are important pieces of managing a very large and challenging whole, Fairfax County's environmental legacy. In the light of the Environmental *Vision* document and subsequent *Improvement Program* we ask that the Board also change focus from the discrete programs to the overall picture of the county's environmental management. In the light of the county approaching build-out, we ask that you look at the integration of the programs and potential for maximizing efforts. Have we created an adequate green infrastructure plan that looks at connecting the thin green lines, the parks and Environmental Quality Corridors in a way that maximizes our efforts at protection? Have we looked at the gray infrastructure (parking lots and other paved impervious surface) in terms of re-use, reducing auto reliance, and sharing parking? Have we an integrated plan for the county in terms of building and transportation that not only focuses on transit but also focuses on increasing pedestrian friendly environments? A recent presentation from a consultant at a meeting of the Tysons Coordinating Committee suggested that if we build our transportation systems oriented towards pedestrians, everything else will fall in to place. EQAC continues to support transit-oriented development (TOD). We note that most citizen opposition to TOD is based on the resulting increase in vehicle traffic that occurs and the impact on adjacent neighborhoods because of that traffic. We urge the county to seek new and innovative solutions.

To that end we would like to focus on the one specific recommendation in the report. We know that the county has formed a committee, in which EQAC has been asked to participate, to begin looking at the replacement of the County's rather old information system UDIS. We urge you to purchase for the county a highly flexible database that will allow the county to do innovative design and management for all the county's resources. A good system would go a long way towards helping the county integrate environmental management with land use and transportation planning in a meaningful way.

Board of Supervisors
Continued

In addition, each chapter of this year's Annual Report contains the remainder of our recommendations. We urge you to consider and act on each of these.

This report covers 2004, but also includes significant actions from 2005 that could impact EQAC's comments and recommendations. We recognize that the report does not capture all ongoing actions; if we tried to accomplish this, the report would never be finished.

As previous reports have done, we would like to commend the outstanding efforts of some groups whose actions improve and safeguard the environment in Fairfax County. The Northern Virginia Soil and Water Conservation District (NVSWCD) continues to provide excellent education programs, to consult with the county on innovative stream restoration work, to have a large and successful stream monitoring program, and to be available to citizens and developers alike for site work consultation. The Northern Virginia Conservation Trust (NVCT) continues to obtain easements on privately owned environmentally sensitive land. Volunteers from the Audubon Naturalist Society provide valuable data on water quality. Fairfax ReLeaf continues to promote tree preservation and tree replacement programs. The Park Authority staff continues to have a few people, working with a very small budget, who are slowly enhancing environmental efforts in the county's parks. The members of EQAC thank all these groups, and all others who work to preserve and enhance the environment of the county.

EQAC would also like to thank and commend the county staff for its continued outstanding work. We thank staff especially for providing the data for this report and for a continued willingness to meet with EQAC to discuss various issues. We commend the county's Environmental Coordinating Committee, which is Chaired by Deputy County Executive Robert A. Stalzer, for its continued efforts at managing environmental action within the county. We appreciate the ECC's willingness to meet with EQAC twice a year and to discuss issues of environmental significance.

EQAC would especially like to thank and acknowledge two individuals. Every year we do this and every year the members of Council continue to be impressed with the work and input of these two people. First, we need to mention Noel Kaplan of the Environment and Development Review Branch, Department of Planning and Zoning. Noel provides county staff support to EQAC. Noel sets up and tapes every EQAC meeting, follows up on actions generated from the meetings, and coordinates the inputs and publication of the Annual Report. Although the members of EQAC write the Annual Report, it is Noel who makes publication of the document possible. EQAC cannot thank him enough for his hard work and long hours in our support.

Second, we thank Kambiz Agazi, Environmental Coordinator, Office of the County Executive, who also attends all our meetings and provides advice and suggestions. His insight and his overview of county environmental activities are invaluable to our work. EQAC thanks him for his assistance and valuable contributions.

Board of Supervisors
Continued

In conclusion, EQAC encourages the Board of Supervisors to both support and fully fund all of the valuable programs designed to protect the county's environment and enhance the quality of life for its citizens. We urge you to take a look at how to integrate these excellent programs to maximize your efforts and returns.

The members of EQAC thank the Board of Supervisors for its leadership and look forward to continue working with you to achieve the goals of the Environmental Excellence Vision for Fairfax County in the coming years.

Respectfully submitted,

A handwritten signature in black ink that reads "Stella M. Koch". The script is cursive and fluid, with the first letters of each word being capitalized and prominent.

Stella M. Koch, Chairman
Environmental Quality Advisory Council

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SCORECARD

Progress Report on 2004 Recommendations

I. LAND USE AND TRANSPORTATION

Land Use & Transportation Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
1a. EQAC recommends that the County produce an updated version of the <u>State of the Plan</u> report to reflect current population shifts, build-out, and infill developments.	Staff will evaluate all Comprehensive Plan amendments that occurred between 1995 and 2003 to analyze how the County's build-out potential has been affected. The analysis will be available in late 2005 and will incorporate amendments associated with the 2004 North County Area Plans Review.	EQAC still believes that a single document addressing the entirety of the County will be valuable in planning.	No.
1b. EQAC recommends that the county continue to pursue replacing or upgrading the UDIS System.	Different agencies are handling different aspects of this recommendation. Staff concurs that UDIS is not able to fulfill its purpose of tracking and linking land use information. Staff has suggested that a formal stakeholders team be established to determine the feasibility of, and an approach to, linking data from various county systems as well as looking at the possibility of new systems to address needs not currently addressed by UDIS.	EQAC supports this suggestion of a stakeholder's team to identify ways to better incorporate countywide land records and land use information in an enterprise system accessible to all county staff.	No.
1c. EQAC recommends that the BOS and DPZ continue to consider land use and transportation together when revising the Comprehensive Plan. Air quality, congestion, commuting patterns, and health effects should also be addressed.	Currently, Plan amendments address transportation and land use at a micro scale rather than a macro scale. The Department of Transportation is conducting a comprehensive review of the County's Transportation Plan that will evaluate future transportation and land use needs at a macro scale. Air Quality is handled at a regional level and will not be addressed through the Transportation Plan.	EQAC reiterates its recommendation.	No.

Land Use & Transportation Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
1d. EQAC recommends that the BOS consider mixed-use principles when locating future public facilities, such as libraries and recreation centers, so that they are within walking/biking distance of major population centers.	The Public Facilities Section of the Policy Plan contains policies and locational standards that encourage many public uses to be accessible, conveniently located, and in support of community identity. Staff will continue to look for opportunities in the planning and development review process to incorporate mixed-use principles when locating public facilities.	EQAC encourages staff to continue to promote mixed-use principles within the CIP.	In process.
2a. EQAC encourages the BOS to continue to aggressively support telecommuting among county staff.	The BOS has continued to endorse the COG goal of 20% of the area's eligible workforce telecommuting by 2005. The County has set a goal of 1,000 workers telecommuting by 2005 and has reached over 800 telecommuting workers in December 2004. Staff feels that the goal of 20% is an aggressive goal.	EQAC agrees that 20% is an aggressive goal and commends the continued efforts to increase telecommuting among its staff.	Yes.
2b. EQAC recommends that the BOS maintain its leadership role in improving the environment through greater use of teleworking by establishing a program directed at encouraging employers in the county to adopt or expand telework opportunities.	Through the Employer Services Program, the county assists employers to find transportation solutions, including teleworking.	Fairfax County has established a leadership role in teleworking and should continue this role through an aggressive campaign to encourage greater use of teleworking as a transportation solution.	Partial.

Land Use & Transportation Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
2c. EQAC recommends that the BOS work with the Federal government to encourage an increase in teleworking. EQAC also recommends that the county work with the Virginia Congressional Delegation to secure resources to establish teleworking sites within the county.	The County is an active partner with members of its state and federal delegations working to secure funding for teleworking initiatives.	EQAC encourages the continuation of seeking increased funding and support for teleworking.	In process.
3a. EQAC recommends that the BOS continue to provide annual funding for the Non-Motorized Transportation (Trails) Committee.	In the past, the Board has provided funding by magisterial district for trail projects; funding has been limited due to budget restrictions. In November, 2004, County voters approved a \$165 million General Obligation Bond Referendum as part of the Board's four-year Transportation Plan. Of the \$165 million, \$10.8 million was designated to fund pedestrian improvements such as sidewalks and trails. Additionally, \$2.5 million was appropriated as part of the FY 2005 Budget for streetlight, drainage, sidewalk, trail, and walkway projects, \$676,000 of which was earmarked for sidewalk and trail construction. Currently, both the Non-Motorized Transportation (Trails) Committee and the Pedestrian Task Force are developing lists of priority projects.	EQAC recommends that trail projects continue to be funded.	In process.
3b. EQAC recommends that transit improvement modeling and dynamic attributes (HOT lanes) be addressed in the 2004 Transportation Plan update.	The Transportation Plan update is in progress, but incorporating transit modeling and HOT lanes is a very sophisticated effort and is not being addressed in the Plan update. If modeling were to be done in the future, additional funding would be required.	EQAC recommends seeking additional funding in order to produce transit & HOT lane modeling.	No.

Land Use & Transportation Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
3c. EQAC recommends that the county focus on improving transit utilization through a systematic plan that focuses on multiple transit options within a community.	This recommendation is being addressed on an ongoing basis. The BOS has directed the Department of Transportation to initiate several projects addressing multi-modal transportation solutions.	EQAC reiterates its recommendation. Because transit planning is done on an ongoing basis, multi-modal transportation solutions should continue to be considered in the planning process in the future.	In process.
3d. EQAC recommends that the BOS instruct the Health Department and Public Affairs Office to produce and disseminate brochure(s) explaining the interrelationship between commuter choices and public health.	Air quality outreach efforts are underway for FY 2005, including making the Clean Air Partners brochure widely available, distribution of a child-friendly brochure about ground level ozone (through FCPS), and implementing a ground level ozone awareness program for county employees.	EQAC encourages the continuation of public outreach and education efforts, but would like to see the relationship between transit choices and public health explained.	No.
3e. EQAC recommends that the BOS encourage the state police to fully enforce HOV restrictions and to increase the penalty for HOV violations. EQAC recommends that the fine for a second HOV offense increase to \$500, with 50% of the fine returned to the respective county.	Based on existing staffing, it would be difficult for the state police to more fully enforce HOV violations, short of using some type of photo enforcement. Increased staffing dedicated to this mission would be needed in order to meet this recommendation.	EQAC reiterates its recommendation.	No.

II. AIR QUALITY

Air Quality Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
1. EQAC recommends full funding for staff in the Health Department supporting air quality management activities in the county. EQAC also recommends that the air quality-monitoring network be maintained.	The county has established an Air Quality Program Manager position in the Health Department to oversee the management and implementation of the county's Air Quality Management Program, to include monitoring and data analysis. Currently, the Air Quality Program consists of one Program Manager, one Data Analyst and three Monitoring Specialists.	EQAC is pleased that our recommendation has been acted upon in this vital area of air quality.	Yes.
2. EQAC continues to be concerned about coordination and integration of critical analysis and conclusions about air quality management in the County. EQAC recommends close coordination and communication between EQAC and the County.	The recommendation is being addressed. The county is strengthening its air quality planning and management capability through the establishment of an Air Quality Program Manager position. The staff agrees with and fully supports EQAC's recommendation to continue and intensify close coordination. Coordination and communication between EQAC and county staff have advanced significantly over the last three years.	EQAC is pleased with progress to date, and urges that coordination and communication continue to be improved.	Solid progress. Need to continue the trend.
3. EQAC is pleased with the work of the county's Air Quality Subcommittee that included a variety of air quality management strategies as shown in the interim report and Clean Air Café menu. EQAC recommends that the Board adopt and implement the recommendations shown in the menu and report.	Several of the key recommendations, including wind energy purchase, education and outreach, pedestrian improvements, expanding metrocheck, clean fueled public transportation vehicles, low emission diesel school bus retrofits, hybrid vehicle purchases, and air quality monitoring equipment replacement were funded by FY 2003 and FY 2004 carry-over funds and have been or are in the process of being implemented. The remaining program recommendations and emission reduction measures will be funded and implemented in phases. The prioritization of the program recommendations and emission reduction measures will be based on the immediacy of the issue and the nature and cost-effectiveness of the emission reduction measure.	Good progress. The remainder of the recommendations in the Clean Air Café menu need to be addressed.	Significant progress – needs to continue.

III. WATER RESOURCES

Water Resources Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
1. EQAC cannot over-emphasize and support the importance of creating a Stormwater Environmental Utility Fee Program for funding of the county's watershed protection and restoration needs. The Stormwater Environmental Utility Fee program is essential to carrying out the recommendations of the Comprehensive Watershed Plans being created throughout the county.	Fairfax County hired the consulting firm AMEC, which developed a Watershed Community Needs Assessment and Funding Options Study to address the strategies for developing a comprehensive stormwater management program and a dedicated funding mechanism to support it. In addition to the study, AMEC facilitated a series of meetings for a Board of Supervisors-appointed committee, the Stormwater Advisory Committee, of residents who have reviewed the level and extent of service of the current stormwater management program and possible funding sources. The Committee met for several months and presented their recommendations to the Board of Supervisors. In the FY 2006 budget, the Board of Supervisors dedicated one penny of the real estate tax rate (\$17.9 million) to the county's stormwater management program.	EQAC is pleased that the recommendation is in the process of being addressed. EQAC is also pleased that the Board of Supervisors approved the one penny of the real estate tax to be dedicated to the stormwater management program. However, this is not adequate. A long-term, sustainable funding source is necessary to carry out the recommendations in all of the watershed management plans and to significantly improve the stormwater management program.	In progress, with more to be done.

Water Resources Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
<p>2. EQAC recommends that increased emphasis be placed on monitoring and enforcement of predevelopment stormwater management controls and the re-examination of “adequate outfall” requirements.</p>	<p>Staff agrees with this recommendation and it is in the process of being addressed. Staff is collaborating with members of industry to develop recommendations to address the increase in stormwater runoff from development sites during the development of the site and enhancing the minimum standards for erosion and sediment control on larger-scale developments to better protect downstream properties from runoff. A committee of private sector engineers will examine the county’s definition and requirements pertaining to adequate outfall. Following these efforts, policy clarifications and/or amendments to the Public Facilities Manual will be processed for consideration by the Board. However, at this time there have been no changes to the Public Facilities Manual that, with the exception of adequate outfall requirements, does not specify the minimum standards of detention pertaining to volume and velocity that must be provided during construction.</p>	<p>EQAC recommends that increased emphasis be placed on monitoring and enforcement of predevelopment stormwater management controls and re-examination of "adequate outfall" requirements. The response indicates that staff is collaborating with industry to address increase stormwater runoff from development sites, enhancing the minimum standards for erosion and sediment control on larger scale developments, and changing the adequate outfall requirements to increase their effectiveness. We want to see follow-up on a firm time line to indicate when these new changes will be implemented. Until then, citizens continue to be faced with inadequate protections.</p>	<p>No.</p>

Water Resources Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
<p>3. EQAC strongly recommends that Fairfax County continue to develop methodology that incorporates into their land use considerations a protocol that would assist them on the individual and cumulative effect of such decisions on the county's waterways.</p>	<p>Staff concurs with EQAC's recommendation. This recommendation continues to be addressed at the watershed scale and the project specific scale. Key actions include watershed management planning, strengthening of stormwater management submission requirements for zoning applications, and better interagency coordination and technical support during the zoning process. Fairfax County is working on developing specific low impact development (LID) techniques that can be incorporated into the Public Facilities Manual. The Fairfax County Park Authority has been exploring ways to incorporate LID practices in county parks.</p>	<p>EQAC is pleased that the recommendation continues to be addressed and worked on. The recommendation is on the way to being satisfied if the county continues with its current activities, although much more needs to be done with regard to funding and implementation. EQAC notes that land use planning is the single most effective tool for the protection of water resources.</p>	<p>In progress, with more to be done.</p>

Water Resources Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
<p>4. EQAC continues to strongly support the full funding and implementation of the comprehensive countywide watershed management program.</p> <p>5. EQAC recommends the creation of a watershed protection and restoration program. The program should devote equal importance to environmental protection, restoration, and monitoring as compared to infrastructure improvement and maintenance. The program should also establish a Watershed Board to oversee the program. Also, the program should encourage and approve bioretention and recharge to aquatic systems and other innovative practices.</p>	<p>This recommendation is in the process of being addressed. A major aspect of this initiative is being pursued through the watershed planning effort and comprehensive stream monitoring program. Changes to the level of service to inspect and maintain the county's BMPs are being discussed through a Board of Supervisor's appointed Stormwater Advisory Committee. Watershed planning efforts include the review of data from the completed 2001 Stream Protection Strategy Baseline Study, the 2003 Stream Physical Assessment, and annual water quality reports from the county Health Department. These data will be enhanced by the comprehensive stream monitoring program, which will include data from volunteer stream monitoring programs, probabilistic random stratified sampling, and wet and dry weather monitoring data (MS4 and VPDES permits).</p> <p>The Stormwater Planning Division reviews and provides recommendations to Land Development Services on detention waiver requests for development projects. Where feasible, LID practices are recommended. As watershed plans are completed, all detention waiver requests will be evaluated for conformance with the recommendations in the plans. With assistance from a private consultant, staff is developing recommendations to integrate LID practices into the PFM.</p>	<p>EQAC's recommendation is on the way to being satisfied – if the county continues with its current activities. EQAC continues to be concerned about dedicated, long-term funding and staffing needs to implement recommendations in the countywide watershed management plans. Additionally, it is important that there is adequate funding for environmental protection and restoration projects compared to just retrofitting and maintenance initiatives. LID techniques and other ecologically innovative practices should be incorporated into the PFM as quickly as possible.</p>	<p>In progress, with more to be done.</p>

Water Resources Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
<p>6. EQAC continues to recommend posting of county streams with a health warning for fecal coliform bacteria until such time that the county conducts a study as to the source of microbiological threats. EQAC recommends that the county initiate such a study within 12 months and subsequently implement a plan to address the sources of actual threats to public health.</p>	<p>Staff agrees that posting of streams is a viable form of notification of impaired waters and potential health hazards. However, staff feels a strategic outreach plan should be explored to conserve resources and effectiveness. In 2003, E. coli concentrations were monitored in addition to fecal coliform. Measuring E. coli will allow the county to better judge the level of water quality impairment and associated health risks. USEPA staff trained county staff on the use of optical brighteners to identify illicit wastewater discharges into the storm drainage network.</p>	<p>EQAC agrees that a strategic outreach plan that identifies highly visible access areas would be more resource efficient. However, EQAC still feels that posting warning signs is an effective and assertive way to disseminate information about problems with contamination in county waterways. The majority of the county's residents remain unaware of the problems with coliform bacteria. EQAC continues to recommend that the county's streams be posted if testing shows contamination. Selective posting could be done at highly visible areas recognized in the outreach plan.</p>	<p>No.</p>

Water Resources Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
7. EQAC recommends a pilot program of monitoring or study on the effectiveness of stormwater detention facilities.	This recommendation continues to be partially addressed. Staff feels that, while a comprehensive countywide program to monitor the effectiveness of stormwater management ponds and BMPs would be desirable, it would be cost prohibitive. The Kingstowne Environmental Monitoring Program is used to evaluate the efficiencies of erosion and sediment controls installed in the Kingstowne development. A second monitoring station was installed to evaluate nutrient loading from the Silver Springs segment of the Dogue Creek watershed. The watershed planning process is currently identifying existing stormwater facilities that may require retrofitting to exceed performance criteria or standards that were used for the original design. Staff also oversees monitoring activities associated with ad hoc projects. Targeted biological monitoring of specific facilities and restoration sites is being considered. Current adequate outfall requirements are under review and preliminary recommendations have been provided to the Board of Supervisors and EQAC.	EQAC recommends that increased emphasis be placed on monitoring and enforcement of predevelopment stormwater management controls. EQAC agrees that a comprehensive program would be cost prohibitive, however, EQAC still recommends selective monitoring for determining the efficiencies of several different facilities. EQAC continues to endorse such a program.	No.

IV. SOLID WASTE MANAGEMENT

Solid Waste Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
1. The county should continue to work with the solid waste hauler community to increase curbside recycling to include multiuse paper and plastic in addition to the items already being collected for recycling.	The Solid Waste Management Program (SWMP) for Fairfax County is in the process of implementing this EQAC recommendation. The new 20-year Solid Waste Management Plan for the county recommended the curbside source separation of certain recyclables for collection countywide. The recommendation was to expand the curbside collection of recyclables to include mixed paper, flattened cardboard, and plastic bottles and jugs. These materials would be source separated from trash at residences throughout Fairfax County for curbside collection and ultimate delivery to a recycling facility. The Recycling Program Requirements will be modified to include these additional recyclables as materials that must be recycled from residences in the county.	The new Solid Waste Management Program should increase amounts and types of recycling. This is in line with EQAC's recommendation.	In process.

Solid Waste Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
<p>2. The county should develop policies that change the recycling requirement for office buildings such that the requirement will apply to office buildings with more than 100 full time employees (FTEs)—the requirement now applies only to office buildings with more than 200 FTEs.</p> <p>3. The county should develop policies that change the recycling requirement for commercial business centers (CBCs, or strip malls) such that the requirement will apply to CBCs that generate more than 50 tons per year of solid waste—the requirement now applies only to CBCs that generate more than 100 tons per year.</p>	<p>The new 20-year Solid Waste Management Plan for the county recommended that additional businesses be required to recycle beyond those currently required to recycle. EQAC’s recommendation is consistent in concept with the SWMP; however, the thresholds eventually established may be greater or lower than suggested. Staff will be developing the new business recycling requirements in consultation with businesses in Fairfax County, and staff is currently working on the various aspects of that task.</p>	<p>Again, the new SWMP is in line with EQAC’s recommendations. EQAC suggests that the threshold be at least that of EQAC’s recommendations.</p>	<p>In process.</p>

V. HAZARDOUS MATERIALS

Hazardous Materials Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
<p>1. EQAC continues to recommend an aggressive public education campaign on how to properly dispose of household/residential, commercial, and industrial hazardous waste. Continuous partnering with the Northern Virginia Board of Realtors and solid waste haulers to distribute information to all new residents in the county is suggested. New residents would be anybody buying or renting a house, townhouse, or condominium. Creative use of other organizations is also encouraged.</p>	<p>The recommendation contains two separate and distinct components: an outreach campaign for hazardous waste generated by residents (Household Hazardous Waste, HHW); and an outreach campaign for commercial and industrial hazardous waste. The county continues to work with the Government Affairs Committee for the N.V.A. Association of Realtors (NVAR). The county's flyer about proper handling of household hazardous waste was printed in its monthly magazine in March, 2004 for the first time and will be reprinted from time to time. NVAR will provide a link from its Web site to the County's Web site. The County's Office of Public Affairs includes information about HHW disposal the I-66 Transfer Station & the I-95 Complex in the monthly e-mail newsletter, "News to Use." Brochures & materials are available at County sponsored community events. Staff has undertaken an update of the county's solid waste management information on the Web site. Staff has requested assistance from haulers through the monthly newsletter and the Solid Waste Task Force. Staff has included a business hazardous waste management outreach component as one of the goals of the business recycling improvement program. Educating businesses has been undertaken through a newsletter, <i>Recycle Works</i> and the Fluorescent Lamp recycling program. The County held three Conditionally Exempt Small Quality Generator (CESQG) events in 2004 and plans three more in 2005. The Fairfax Chamber of Commerce has agreed to help publicize these events.</p>	<p>EQAC recognizes outreach and educational efforts made by staff for hazardous materials disposal. These efforts have reached many people and businesses. Staff has worked with creative partnering to assist with this effort. All of the effort could be evaluated as accomplishing the recommendation. EQAC recognizes this fact, but strongly believes, with the growth in Fairfax County, that there are many more residents and businesses to reach, as well as to continuously remind those residents and businesses currently complying. These efforts, as well as new ideas, by the staff must be continuous each year.</p>	<p>Yes. Should always be in progress. Positive efforts have been, and are being, made. This effort needs to be consistent and ongoing.</p>

Hazardous Materials Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
<p>2. The county should institute the recycling of NiCad batteries at the I-66 Transfer Station, the I-95 SW site, and other sites. With the growing popularity and use of rechargeable battery products, especially cell phones, EQAC recommends an aggressive program to promote recycling of NiCad batteries. Commercial efforts should continue and even expand. Schools and other organizations should be encouraged to come up with creative initiative to promote significant increases in recycling rechargeable batteries.</p>	<p>County staff continues to develop the rechargeable battery recycling program in conjunction with businesses and schools. Rechargeable batteries will continue to be collected from residents at the county's HHW facilities at the solid waste management complexes. The county encourages responsible management of all hazardous waste generated by businesses, including rechargeable batteries, and will accept these at the CESQG events. The county will continue to create partnerships with businesses to accomplish this. One partnership anticipated is promoting the use of the Rechargeable Batteries Recycling Corporation (RBRC) by businesses in the county. Staff will continue to strengthen its relationship with FCPS and other staff to get recycling information into the schools. Recycling Roadshows, a partnership with some schools, are recycling events conducted on school property using school volunteers. These events can be used to collect rechargeable batteries.</p>	<p>EQAC is optimistic about the initial steps taken by staff. The Recycling Roadshows partnership should be greatly expanded to reach all schools in Fairfax County. Through the schools, material and information can be taken into the homes. EQAC expects the NiCad battery issue to be a problem that, at best will remain at its current level, but most likely will become a larger problem in the years ahead.</p>	<p>Some progress, but more needs to be done.</p>

Hazardous Materials Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
3. Efforts to locate financing to cover the printing cost of Hazardous Waste and Environmental Crime Materials should continue as new sources of grants and funding may become available.	Opportunities for funding the Hazardous Waste and Environmental Crimes materials should be pursued through the Office of Emergency Management (OEM), where funds may be available. The Fire & Rescue Department is working to obtain financing to cover the cost of Hazardous Waste and Environmental Crimes Materials through the Local Emergency Planning Committee (LEPC). These materials should be presented in at least a bi-lingual format. The funding needs to be available annually. The Stormwater Planning Division (SWPD) is willing to work collaboratively with other county agencies to develop outreach materials. SWPD believes that this would be a worthwhile effort as dumping of hazardous materials, including oil, paint, fertilizers, etc. into the storm drain network is one of the leading causes of limited recreational use of the county's waterways.	EQAC is cautiously optimistic that OEM indicates funds may be available and the SWPD is willing to collaborate. Maybe the Park Authority could be of assistance based on SWPD's comment. However, a definitive answer and plan were not indicated in the response.	No.

Hazardous Materials Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
<p>4. EQAC recommends continuing to advertise and educate the public regarding the types of hazardous materials and other environmental situations citizens are requested to report, including whom they are to contact. Possible avenues are community association newsletters, press release stories to the media, and age appropriate material sent home through the schools.</p>	<p>The Fire & Rescue Department agrees with this recommendation and will continue to work through its Public Information Officer and the Office of Public Affairs (OPA) to advertise and education the public regarding the types of hazardous materials and other environmental situations citizens are requested to report. The Fire & Rescue Dept., OPA, and the Fairfax Joint Local Emergency Planning Committee (FJLEPC) have worked together for many years to develop educational materials regarding reporting hazardous materials releases in the county. These groups continue to work together to develop avenues to disseminate information to citizens through the FJLEPC Web site and community events. However, limited funding is available to support the efforts of the FJLEPC to maintain its Web site. A high school student developed the current Web site as a community service project. Fire & Rescue does not have the staffing or resources to be able to support the FJLEPC in this endeavor. In addition, the funding necessary to develop, print, and market the programs/educational materials has not be identified.</p>	<p>While EQAC believes the response is accurate and complete, it is unsatisfactory. As the LEPC is an unfunded federal mandate, and that this is not completely detached from emergency preparedness, avenues for state and federal funds/grants could be explored. Perhaps a college student doing a service project or internship could assist with this.</p>	<p>No.</p>

VI. ECOLOGICAL RESOURCES

Ecological Resources Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
1. EQAC recommends that the County BOS develop and implement a Countywide Natural Resource Management Plan. Two tasks should be done first: complete a Countywide Baseline Natural Resource Inventory and adopt a unified Natural Resource Conservation Policy.	Staff concurs with EQAC's recommendation. A comprehensive survey and mapping of vegetation ecosystems that occur in Fairfax County support this recommendation. A Countywide Baseline Natural Resource Inventory survey is being conducted by the Urban Forest Management Branch of the Department of Public Works and Environmental Services that can eventually take into account all terrestrial biotic resources, including flora and fauna existing on private and public properties. In addition, the Fairfax County Park Authority recently adopted a 2002-2006 Natural Resource Management Plan for Park Authority lands. The Stormwater Planning Division is coordinating the development of watershed plans the each of the County's watersheds.	This is a long-standing EQAC recommendation. EQAC notes that efforts are underway that support EQAC's recommendation. However, inadequate funding exists to implement the Natural Resource Management Plan. EQAC supports these efforts and reiterates its recommendation.	Improved progress, but more needs to be done.
2. EQAC recommends continued support for the public-private partnership with the Northern Virginia Conservation Trust (NVCT) and further recommends the existing three-year agreement be extended.	Funding was appropriated to the NVCT for FY 05 for \$250,602. The Department of Planning and Zoning supports contributory agency status for NVCT. No further action is required. The Board of Supervisors will determine on a year-to-year basis the funding that can be allocated to NVCT.	EQAC commends the BOS for creating the original public-private partnership with NVCT. The BOS is funding NVCT past the term of the original three-year MOU. However, a new MOU was not put into place. EQAC supports a continuing partnership with NVCT, not a year-to-year program. Therefore, EQAC recommends that a multi-year MOU be accomplished.	Program funded, but no MOU.

Ecological Resources Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
3. EQAC recommends that the BOS continue to support proposals to amend Virginia State Code §15.2-961, allowing the county to enact tree preservation ordinances.	Staff concurs that the county should continue to pursue new tree preservation legislation or amendments to existing Virginia State Code § 15.2-961 at the Virginia General Assembly. The 2005 Fairfax County Legislative Program contained two tree-related matters: a legislative position supporting HB1479, which is a proposal to amend § 15.2-961 so that the existing tree cover requirements place higher emphasis on tree preservation; and a proposed resolution concerning the use of tree preservation and planting measures in Virginia's air quality management plan. Unfortunately, HB1479 (tree preservation) died in the Counties, Cities, and Towns Committee. SJ343 (use of tree preservation and planting measures in Virginia's air quality management plan) died in the Rules Committee.	EQAC is extremely disappointed that the efforts to enact tree preservation ordinances have failed. EQAC continues to recommend that the BOS continue to pursue legislation that would allow a tree preservation ordinance.	No.
4. Fairfax County no longer has Soil Science expertise on the county staff. However, the BOS did provide funding to the Northern Virginia Soil and Water Conservation District (NVSWCD) for mapping of the county's soils. EQAC recommends that the Board of Supervisors continue the agreement with NVSWD to provide soil scientist expertise	The soil scientist position in the NVSWCD will be funded through June, 2007. Staff recommends that the expertise of the soil scientist is needed in the county, and that the soil scientist position should be extended beyond the completion of the soil survey update, due to be completed in January, 2007.	EQAC reiterates its recommendation.	No.

VII-1. IMPACTS OF DEER IN FAIRFAX COUNTY

Deer Management Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
1. EQAC recommends that the Board of Supervisors continue to implement and monitor the comprehensive deer management program as set forth in the November, 1998 Integrated Deer Management Plan and refined by the Deer Management Committee in the summer of 1999 and in subsequent meetings.	This recommendation continues to be addressed. The Fairfax County Park Authority continues to work with the County Wildlife Biologist to move toward the objectives stated in the Countywide Deer Management Program. Diligent efforts of Park Authority and Police Department staff have reduced the herd population in several parks to the point where previously bare forest floors are again covered in wildflowers and seedling trees and shrubs.	EQAC notes that actions taken to date continue to support EQAC's recommendation, and progress over last year can be seen. However, the results are a long way from restoring natural areas to the former levels of biodiversity. The changes noted in several parks are encouraging; however, actions to manage the deer population need to continue and to be increased.	In process.
2. EQAC strongly commends active participation of the Fairfax County Park Authority in the deer management program.	This recommendation continues to be addressed. The Park Authority continues to work within the guidelines of its Wildlife Conflict Resolution Policy to reduce and mitigate the impact of an overabundant white-tailed deer population. The agency is continually researching ways to minimize the effect the herd has on parks. Park staff work with the County Wildlife Biologist, his staff, and police officers to carry out herd reduction activities.	Results satisfactory in parks where program has been implemented; needs to be implemented in other parks that have not yet been included in the program.	In process.

Deer Management Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
3. EQAC believes the deer management program must address problems of owners of small private properties.	The Virginia Department of Game & Inland Fisheries (DGIF) will issue permits to property owners experiencing damage from any wildlife, but many citizens are not aware of this program. DGIF and Fairfax County have increased efforts to inform citizens of this program. Additionally, state code now allows an extended urban archery deer-hunting season. The County Deer Management Web page provides information about methods available to private property owners.	The Virginia Department of Game and Inland Fisheries is planning more rules that will help accommodate the needs of impacted county residents. county staff should be prepared to update residents who contact the county with regard to deer problems and the new rules should be made available on the relevant section of the county Web site. The Animal Control Division of FCPD should examine the feasibility of a limited extension of the sharpshooter program to selected parcels of private property.	In process.
4. EQAC believes the management program must accomplish: (1) immediate, sustained reduction of deer population; (2) ongoing monitoring of availability of methods for maintaining population limits; (3) consideration of development and its effects on ecosystem health and biodiversity.	The deer management program continues to reduce local herds to levels consistent with long-term carrying capacity of remaining habitats. Managed hunts, sharpshooting, and private/public partnerships are combined to apply the necessary control pressure to first stabilize and then reduce deer herds. Fairfax County continues to monitor developments and progress of non-lethal methods of deer herd control. There are several strategies within the recently completed FCPA Natural Resource Management Plan that relate to wildlife conflict resolution, continued evaluation of forest habitat values, and the impacts of park and private development on the biodiversity and ecosystem health in the parks.	This recommendation continues to be very satisfactorily addressed.	In process.

Deer Management Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
5. EQAC strongly recommends the Board of Supervisors continue to provide for a vigorous and enhanced program of public education as is now being done by the Division of Animal Services and on the county Web site.	Educational efforts have been underway since the start of the Deer Management Program. Efforts include programs on Channel 16, publications available in the Fairfax County Library system, interactive displays at Celebrate Fairfax, and programs by the Fairfax County Wildlife Biologist.	This recommendation continues to be very satisfactorily addressed.	Yes.
6. EQAC strongly endorses on-going public input into the Deer Management Plan.	The county Web page devoted to deer management issues continues to be updated and expanded. This site provides a wealth of information to citizens about the issue and the efforts being undertaken to deal with the associated problems. Citizens are able to send e-mail through this site to voice their opinions or to ask questions. Input is also received from citizens via telephone, e-mail, or conversations at meetings of special interest groups, civic associations, professional conferences, garden clubs, or other public gatherings.	This recommendation continues to be very satisfactorily addressed.	Yes.

VII-2. IMPACTS OF GEESE IN FAIRFAX COUNTY

Geese Management Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
1. EQAC finds the current programs are effective and should be continued.	The Animal Services concurs with EQAC's recommendation and intends to continue and expand the current programs. However, GeesePeace personnel notified the Animal Services Division that they would be unable to continue the program partnership with Fairfax County.	EQAC continues to support continuation and expansion of current efforts. Since termination of the partnership with GeesePeace, the BOS should ensure that adequate County funding is provided.	Yes.
2. EQAC feels that the current programs need to be replicated in many other areas of the county.	Efforts will be directed to expand the number of trained volunteers and of cooperating property owners.	This part of the program is being pursued at a level consistent with the funding available. Some additional resources will be needed to bring it to the desired level.	In process.
3. EQAC recommends enhanced public education outreach to sensitize Fairfax County residents to the pollution problems caused by geese and the programs available for addressing them.	The Animal Services Division will be working in cooperation with state and federal officials to gather data on the effects of resident goose populations upon local tidal marshlands in Fairfax County. This information will be provided to the public through existing methods. The Division has worked with Channel 16 to produce programming, which covers Canada geese, and the issues related to them.	This part of the program is being pursued at a level consistent with the funding available. Some additional resources will be needed to bring it to the desired level of outreach.	In process.
4. EQAC recommends enhanced public outreach to acquaint Fairfax County residents with the destructive role excessive goose populations play in our marshland habitats.	The Animal Services Division is presently developing a goose management program to replace the program formally known as GeesePeace. The Fairfax County Wildlife Biologist provides information about all available options and programs to property owners through telephone and e-mail contacts. A new Web site will be developed to better convey current information and available management options.	This part of the program is being pursued at a level consistent with the funding available. Use of various media to provide educational material to the public has been excellent. However, some additional resources may be needed to bring these activities to the desired level.	In process.

VII-3. WILDLIFE BORNE DISEASES OF CONCERN IN FAIRFAX COUNTY

Wildlife Borne Disease Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
1. EQAC recommends that the BOS provide continued active support to the reorganized Stream Monitoring Program in which the Stream Protection Strategies Program of the DPWES will perform sample collection and field testing and the Health Department will perform lab testing and analysis functions. EQAC recommends that the county staff ensure the posting of advisories on the county Web site when polluted waters are identified.	DPWES assumed the Health Department's role of collecting water quality samples in calendar year 2003. The Health Department laboratory will continue to process collected samples for fecal coliform and E. coli bacteria, in addition to phosphorous, nitrate, and nitrite levels. This recommendation, as it related to posting advisories to the county's Web sites, is in the process of being addressed. Web pages are currently being developed for posting advisories, reporting annual results, and providing educational information. The county's comprehensive biological stream monitoring report will also be available for download from the county's Web site. News releases for local and regional newspapers on information related to the annual report and county staff will prepare stream advisories.	The reorganized stream monitoring program appears to be working well and more efficiently than before. The Web page listing monitoring data is not yet online but is in development and should be available some time in the summer.	In process.
2. The Health Department should continue and enhance its excellent public education programs.	This recommendation is in the process of being implemented and is being enhanced as EQAC has recommended. The Health Department has translated some of its more essential West Nile Virus public education material into Spanish, Korean, Vietnamese, and Basic Chinese and has evaluated the impact of this program with a Knowledge, Attitudes, and Practices (KAP) study that was concluded prior to FY 2005. The KAP study is allowing the Health Department to better direct the West Nile Virus public education and information program.	This recommendation is being very satisfactorily addressed.	Yes.

Wildlife Borne Disease Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
3. The Police Department should continue its animal control program and, in conjunction with the Health Department, expand public education initiatives in key areas such as rabies and wildlife contributions to pollution of surface waters.	The Animal Services Division routinely provides the public with information on rabies and other wildlife borne diseases. Rabies is addressed on the Animal Services Web page. Both the Health Department and the Animal Services Division participate in the Animal Control Regional Roundtable. This is a group compiled of representatives from the animal control departments and health departments of various jurisdictions throughout the region. This group has chosen to expand the topics of discussion beyond rabies to include all wildlife diseases.	This recommendation is being very satisfactorily addressed.	Yes.
4. EQAC recommends that the BOS provide active support to the newly instituted program for epidemiology and abatement of insect vector-borne diseases such as West Nile Virus and malaria. EQAC also recommends that the BOS monitor this program.	This recommendation is being addressed. The BOS has provided, and continues providing, support for the newly instituted program for epidemiology and abatement of insect vector-borne diseases. The Health Department provided periodic reports on the program and the Health Department periodically informs the BOS in more direct manners.	This program appears to be progressing satisfactorily. One very important caveat should be noted: great caution should be exercised in using larvicides in storm drains as the effluent from these drains goes directly into our streams and can be lethal to many of the macro-invertebrates that live therein.	Yes.

VIII-1. NOISE

Noise Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
1. Continue to support airport noise compatible land use planning near airports in the county through the implementation of policies and regulations that reference the most current airport noise contour projections for the airports and that are at least as stringent as federal noise compatibility guidelines.	This recommendation has been addressed and will need to be revisited whenever updated airport noise projection information becomes available.	The recommendation has been addressed.	Yes.
2. Develop and distribute materials to educate the public on airport noise issues. Incorporate these educational materials into the county's overall environmental educational efforts.	This recommendation has not been addressed and is not in progress. Pursuit of EQAC's recommended educational efforts would be desirable but would need to be considered in terms of overall resources available for this and other demands on staff resources. It will not be possible to develop a public information campaign in a time frame that would result in dissemination of this information in advance of the end of the public comment period for the proposed construction of new runways at Dulles Airport.	EQAC continues to recommend a public education program.	No.
3. Support the addition of new runways at Washington Dulles International Airport as long as aircraft operations at the airport associated with this increased operational capacity do not result in overall net increases in noise exposures to residents of Fairfax County when compared with operations that would occur using existing runways.	This recommendation has been addressed. Staff has suggested, in its comments to FAA, the need for further coordination and clarification regarding a number of issues. It is likely that these issues will be discussed in the Final Environmental Impact Statement (FEIS), and staff will review this document once it is issued (anticipated later in 2005)	EQAC agrees with the staff approach.	In process.

Noise Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
4. Encourage the use of opportunities provided by the Virginia Department of Transportation (VDOT) that allow for third party contributions to noise barrier construction when the VDOT cost criteria preclude VDOT's construction of such barriers.	VDOT adopted a Noise Abatement Policy based upon Federal Highway Administration (FHWA) regulations. The State Noise Abatement Policy (SNAP) provides opportunity for third party funding when the cost of a noise abatement measure exceeds VDOT's cost effectiveness ceiling but the measure otherwise satisfies the criteria contained in this policy.	Fairfax County should continue to use its proffer authority with developers to provide noise abatement measures and/or funding mechanisms to provide noise abatement measures consistent with VDOT noise abatement specifications. Fairfax County should also continue to coordinate with VDOT to determine where sound walls are already planned as part of a VDOT road construction project, which may offset abatement costs for the developer and/or VDOT.	In process.

Noise Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
5. Encourage the retention and planting of noninvasive vegetation to provide visual shielding of residents from highways. Where possible, support the provision of vegetated areas adjacent to highways that are wide enough and dense enough to provide noise reduction benefits to residential areas near the highways. Where feasible and appropriate, pursue such approaches in lieu of noise walls	Narrow bands of trees are ineffective as noise barriers and only provide psychological benefit. For a vegetated area to have a significant impact on noise, it must be dense enough so that it cannot be seen through and wide enough to provide a significant benefit. Staff agrees with EQAC's recommendation to preserve and plant trees where possible adjacent to highways, generally in addition to, rather than instead of, more traditional structural barriers.	EQAC supports retention and planting of noninvasive vegetation.	In process.
6. Review all airport and highway studies that require Environmental Assessments or Environmental Impact Statements under the National Environmental Policy Act (NEPA) for consistency with county policies addressing transportation-related noise and mitigation.	Staff concurs with this recommendation and is addressing it on a continuing basis as NEPA-related documents are issued.	EQAC supports the staff in reviewing NEPA-related documents as they are issued.	In process.

VIII-2. LIGHT POLLUTION

Light Pollution Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
<p>1. EQAC recommends that the Board of Supervisors ensure that the Fairfax County Public Schools and the Fairfax County Park Authority fully comply with the new Ordinance. EQAC further strongly recommends that the Board of Supervisors appoint a task force to determine appropriate standards and technology for lighting of athletic fields countywide.</p>	<p>Fairfax County Public Schools (FCPS) is compliant with the new Ordinance. In addition, as lighting fixtures are replaced for maintenance purposes, FCPS is changing the fixtures to be in compliance.</p> <p>The Fairfax County Park Authority (FCPA) ensures that all new and replacement lighting is in compliance with the new Ordinance as well as the recommendations of the Illuminating Engineering Society of North America. FCPA has contracted with a technical lighting consultant to prepare a report recommending specific products and applications for recreation lighting that are efficient and compatible with community needs.</p> <p>FCPA feels that a new task force would be redundant to ongoing efforts.</p>	<p>The new Outdoor Lighting Ordinance, while excellent in most respects, has one major deficiency. At the time of adoption, good standards for glare (as opposed to illumination on the ground) did not exist and were not included in the Ordinance. Neither the FCPA or FCPS respondents clearly understand this distinction, but simply assert that the Ordinance is being followed.</p> <p>The study to which the FCPA response refers has been challenged on both procedural and technical grounds. Until its credibility can be assessed, it cannot be regarded as an adequate basis for further field lighting projects. Thus, the recommendation to the BOS that the BOS (not the FCPA or the FCPS) appoint a task force to determine and develop appropriate standards and technology for the lighting of athletic fields (and perhaps certain industrial and commercial facilities) countywide has not been addressed and is reiterated on an urgent basis.</p>	No.

Light Pollution Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
2. EQAC recommends that the Board of Supervisors direct that exterior lighting fixtures installed on Fairfax County facilities and properties be consistent with the new Ordinance. EQAC recommends that the Board of Supervisors direct that all older lighting fixtures under County control that do not meet the above standards be replaced on a phased basis.	All new exterior lighting fixtures installed on Fairfax County facilities and properties are required to, and will adhere to, the new Ordinance. The retrofitting of the 500 to 600 older exterior lighting fixtures located at county facilities is not being pursued at this time. There are no funds available for the initial conversion of these existing light fixtures. Furthermore, some of the fixtures would need to be increased to a higher wattage in order to meet current lighting standards. No funds exist for the higher annual operation and maintenance costs for the increased intensity required.	EQAC reiterates the recommendation, pointing out that the recommendation calls for a phased replacement. Estimates are that the cost of conversion will be repaid by lower O&M costs within a three to five year period.	Yes for new fixtures, but not for existing fixtures.
3. EQAC recommends that the BOS work with VDOT and Virginia elected officials to eliminate unnecessary roadway lighting and to achieve replacement of existing poorly designed fixtures.	All new future roadway projects for the roadway lighting will use the same type of fixtures as specified in the new ordinance. It is not feasible to replace all existing old fixtures with new fixtures. However, it is VDOT's intention to replace the old fixture with a new fixture on an as needed basis.	Follow-up conversations with VDOT have not been productive in terms of initiating a dialogue about how and when these problems may be addressed. The BOS is again urged to use its direct influence on VDOT to promote a reasonable dialog on these issues.	No.

Light Pollution Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
4. EQAC recommends that the Board of Supervisors monitor and evaluate the effectiveness of the recently enacted Outdoor Lighting Ordinance to determine any areas in which enhancements and modifications may be needed.	The new ordinance became effective on June 17, 2003. Overall, it is believed that the new standards are working well and will be effective in the reduction of glare. Staff's current monitoring activities should continue and adjustments to the outdoor lighting standards be considered as new information becomes known and additional projects are approved and built under the current standards.	This recommendation is being very satisfactorily addressed by the staff team responsible for drafting the Ordinance.	In process.
5. EQAC recommends that the Board of Supervisors support county staff efforts to develop any additional technical information that may be needed for the education of architects, contractors, electricians, and builders as to what the county permits and does not permit in the field of illumination and the technology available for compliant installation.	A booklet entitled "A Guide to Fairfax County's Lighting Standards" was prepared by staff and distributed in September 2003. This booklet provides an overview of the outdoor lighting standards that became effective on June 17, 2003. In addition, staff has assisted many builders, architects, and engineers in the design of outdoor lighting for both new developments and redevelopment of existing sites.	This recommendation continues to be very satisfactorily addressed by the staff team responsible for drafting the Ordinance.	Yes.

VIII-3. VISUAL POLLUTION AND URBAN BLIGHT

Visual Pollution Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
<p>1. EQAC strongly recommends that the lack of an explicit provision in Article 12-300 of the present Ordinance for assessment of civil penalties be rectified at the earliest opportunity. Civil penalty provisions need to be clear for sign violations, with an option to pursue such violations as a criminal misdemeanor if repeat offenses occur.</p>	<p>Va. Code Ann. § 15.2-2209 specifically provides that designation of a specific zoning violation for a civil penalty shall be in lieu of criminal sanctions, except for a violation resulting in injury to persons, and precludes prosecution of that specified violation as a misdemeanor in a criminal case. The BOS is considering entering into an agreement with the Commonwealth Transportation Commissioner which would permit the County to enforce the provisions of Va. Code Ann. § 33.1-373, which prohibits advertising in the public rights-of-way.</p>	<p>Civil penalties need to be clearly stated in the same section of the Ordinance as the rules governing placement of signs, even though other sections of the Ordinance may cover these. The EQAC recommendations have been revised so that there is now no conflict with the state law prohibiting both civil penalties and criminal sanctions.</p> <p>It is encouraging that the BOS is considering establishing an agreement with the Commonwealth Transportation Commissioner that would permit the County to enforce the provisions of State law regarding signage unlawfully placed in the right-of-way. EQAC encourages this approach.</p>	<p>No.</p>

Visual Pollution Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
2. EQAC strongly urges the BOS to again consider the Fairfax County Sign Task Force report and either implement its findings or reconstitute the Task Force to find alternatives that are more palatable to the Board and the citizens of the County.	The Virginia General Assembly did adopt an amendment to Virginia Code as recommended by the Task Force that provides authority for Fairfax County to enter into an agreement with the Commonwealth Transportation Commissioner to enforce Virginia Code that prohibits advertising within the limits of any highway. However, this enforcement agreement will not apply to political signs and special event signs that may remain in the right-of-way for no more than three days after the election or special event. The staff of the Zoning Enforcement Branch of the Department of Planning and Zoning is in the process of formulating a proposed approach for implementing an enforcement program should the BOS decide to enter into such an agreement.	EQAC reiterates its support of the general premises underpinning the Task Force recommendations.	Partial.
3. EQAC support the general premise underpinning each of the Task Force's recommendations, but believes that before the County seeks any amendments to the Code and introduces new programs of its own, a study should be performed to determine the impact on existing programs, staffing, and budget, and that a cost benefit analysis be performed to determine the extent to which the proposed amendments or additions would contribute to reducing visual pollution in a cost-effective manner.	As part of the development of this sign enforcement program, staff will identify the impacts on existing programs, staffing, and budgetary considerations, which will be presented to the Board of Supervisors. A cost benefit analysis for a sign removal program may be conducted upon the conclusion of the first year of the program.	EQAC reiterates its recommendation.	In process.

ANNUAL REPORT ON THE ENVIRONMENT

CHAPTER I

**LAND USE AND
TRANSPORTATION**

I. LAND USE AND TRANSPORTATION

A. ISSUES AND OVERVIEW

This Chapter considers the environmental aspects of land use and transportation, both separately and as they relate to each other from an environmental perspective. According to the Fairfax County Comprehensive Plan, “If current trends continue, the supply of land presently planned for residential development will be all but exhausted shortly after the turn of the century [2000].”¹ As we approach this “buildout,” the focus of land use across the county is shifting from new development to revitalization and redevelopment. Each acre in the county becomes more valuable every day. The desire to maximize land utilization or productivity puts a strain on all types of land, from residential to commercial to parkland.

While the amount of available land has decreased, the Plan potential has been increasing. The potential is the number of units that can be built in the county according to the current Plan. It changes as requests are evaluated and adopted by the Board. Since 1989, there have been 80,585 new townhouses and multifamily units added and 927 single family homes removed from the Plan. This clearly demonstrates the increased intensity planned for the county.

At the same time, transportation systems across the county and metropolitan region are becoming increasingly congested. During rush hour, most highways in the county receive a failing grade for peak hour level of service. Over the past 15 years, highway construction in the Washington area outpaced population growth², yet congestion has still increased. This is due to increased per capita vehicle mileage that puts severe strains on the transportation infrastructure. The cost of congestion in the region is estimated at \$667 per person in 2001, up from \$320 in 1991.³

The same study estimates that, without the Metro system, each person would incur an additional 13.7 hours of congestion/year. Metro carries nearly 20% of all rush hour trips in the Metropolitan area, with a carrying capacity equivalent to 1,400 miles of roads, or roughly 11% of the road capacity.⁴ The limiting factors to expanded Metro service are convenient access to Metro stations and train capacity. Currently, most Metro parking lots in Fairfax County are full by 8:00 A.M.

The buildout of our land use plan combined with the overload of our transportation infrastructure will continue to increase as the county population increases. Fairfax County is currently home to over one million people. It is projected to increase by another 15 percent between 2000 and 2010, and yet another five to seven percent

¹ Fairfax County Comprehensive Plan, 2003 Edition, Land Use Chapter

² “Where We are Growing”, Southern Environmental Law Center, 2002

³ Texas Transportation Initiative, 2003 Urban Mobility Study

⁴ Washington Metropolitan Area Transit Authority, www.wmata.com/about/metromattersfactsheet.pdf

between 2010 and 2020. This growth will present a challenge to the Comprehensive Plan goals of maintaining an “attractive and pleasant quality of life.”

As noted throughout this Annual Report, pressures from growth throughout the county directly effect our environment and consequently affect our quality of life, health, and natural experiences. The Comprehensive Plan specifically calls out strategies and patterns that can address land use and transportation together. Mixed-use development is an important tool to combine residential and commercial development to “enhance the sense of community” and to “increase transportation efficiency.” It provides an opportunity for residents to live and work in the same area, thus reducing transportation needs while increasing the population density to support local businesses and mass transit.

The Board of Supervisors highlighted the effects of growth and congestion in its vision paper: **Environmental Excellence for Fairfax County, A 20-Year Vision**. A variety of tools were specifically called out, including mixed use development and Low Impact Development (LID). In addition, problems that at first seem tangential to the environment, such as neighborhood disruption through tear-down development and low income housing, were raised. Teardowns are becoming more common across the county, as single family homes are replaced with larger homes. The lack of low-income housing means workers cannot afford to live and work in Fairfax County and need to commute from outside the county, which exacerbates problems of both pollution and congestion.

The county faces great challenges from the combined effect of:

1. Land use constraints that result from reaching build-out and transitioning from a growth focus to redevelopment;
2. Transportation systems strained by congestion and getting further constrained by sprawl beyond the county; and
3. Population growth that will require additional residential and commercial facilities and transportation options.

By planning and learning from our past and from other communities, we can face these challenges and continue to have a high quality of life that includes a healthy environment with natural resources and experiences that are treasured by the county citizens.

1. Trends and Concepts

Important concepts that begin to combine land use and transportation are sprawl, smart growth, and new urbanism. Sprawl is the unrestricted growth out from the core of a city or a county. In the 1970s, Fairfax was one of the

nation's fastest growing counties. Today that rapid growth that is happening beyond Fairfax County, in Loudoun and Prince William Counties. As of 2003, Loudoun County was the fastest growing county in the nation, averaging 12.6% growth per year. This outer county sprawl directly affects Fairfax County through increased road congestion, changing property values, and inefficient use of Fairfax County's infrastructure.

Smart growth is the antithesis of sprawl; it can be defined as environmentally-sensitive land development with the goals of minimizing dependence on auto transportation, reducing air pollution, and making infrastructure investments more efficient. The Coalition for Smarter Growth lists the following principles for Smart Growth:

- Mix land uses;
- Take advantage of compact building design;
- Create housing opportunities and choices;
- Create walkable communities;
- Foster distinctive, attractive communities with a strong sense of place;
- Preserve open space, farmland, natural beauty, and critical environmental areas;
- Strengthen and direct development toward existing communities;
- Provide a variety of transportation choices;
- Make development decisions predictable, fair, and cost-effective; and
- Encourage community and stakeholder collaboration in development decisions.

Reston and the Orange Line corridor through Arlington are good examples of smart growth.

New Urbanism is a design movement that is going beyond smart growth into community building based on traditional urban centers. New Urbanists are working to improve land use by focusing on walkable communities and town centers.⁵

An important New Urbanist concept to encourage consistent planned development in a community is called **Form Based Codes**. These codes define an appropriate form of development and provide incentives for developers to adopt them. They have been successfully adopted as part of the Columbia Pike revitalization in Arlington County. The community worked through a series of **charrettes** with a planning consultant to create a vision for the new "pike." Form Based Codes provide clear direction on the adopted vision, while incentives encourage developers to adopt the form as the Pike is redeveloped. In particular, developers who follow the codes have an expedited review and approval process.

⁵ Charter of the New Urbanism at: <http://www.cnu.org/about/index.cfm>.

Infill is the process of filling in larger lots with multiple or larger housing and is a key component to reducing urban sprawl.⁶ Infill development can provide new housing or commercial development on vacant or underutilized sites within developed areas, taking advantage of existing infrastructure. While infill provides increased land utilization, it also has the potential to increase the environmental impact upon the infilled community. Particular concern should be paid to the impacts of infill, such as increased stormwater runoff due to additional impervious surface and loss of tree canopy.

Transit Oriented Development or Design (TOD) is another approach to creating walkable, livable communities. TOD encourages increased multi-use density around transit centers. The goal of TOD is to promote walking, biking, or transit as a means of getting to work or the store instead of by car. By focusing development around transit centers, ideally communities will have increased transit ridership, less traffic, reduced pollution, and a better quality of life.

Other concepts that combine land use and transportation provide less dramatic changes to traditional subdivision development. **Clustering** provides residential development that allows homes to be built close together with the remaining acreage left as open space in perpetuity. Generally, homes are sited on smaller lots, with the remaining land dedicated to open space. In most cases, the density of homes in a cluster development is the same as what would have been built on the entire site; the development is just configured differently. The challenge with clustering is the lack of public trust that the open space will remain open.

Low Impact Development (LID) is an approach that reduces the impact of development on a site. The goal of LID is to better integrate the natural environment with the built environment. LID techniques are intended to mimic an area's natural hydrology to manage stormwater on site, thereby reducing adverse downstream impacts.⁷ For example, LID will reduce the amount of impervious surface on a site and reduce the amount of stormwater runoff leaving the site. LID tends to be relatively economical and is flexible enough to be applied to different types of landscapes.

Green Building is another approach to lowering the impact of development by designing structures to conserve resources and using technology that is more efficient. Green roofs can be built with succulent plant gardens that absorb water during rain storms and gradually release it back to dramatically reduce runoff and stream pollution. The county has installed one such roof at the Providence District office to demonstrate feasibility, and a very successful and attractive green roof has been installed at the Yorktowne Square

⁶ Greenbelt Alliance, Smart Infill: Creating More Livable Communities in the Bay Area, at http://www.greenbelt.org/downloads/resources/report_smartinfill.pdf

⁷ Low Impact Development Center at: <http://www.lid-stormwater.net/intro/background.htm>

Condominiums⁸ in Merrifield. Highly efficient and solar energy systems also minimize the environmental impact.

High Occupancy Toll (HOT) Lanes are a tool to ease traffic congestion in urban areas. The idea behind HOT lanes is to open High Occupancy Vehicle (HOV) lanes up to single occupant vehicles that pay a toll. The price of the toll varies, depending on the time of day and amount of traffic. An additional benefit of HOT lanes is that they can provide additional revenue to pay for other transportation improvements.⁹

2. Macro Considerations

Many decisions in the county that affect land use and transportation are made on a micro level. That is, they affect a single parcel or neighborhood. The macro effect of many small changes has a great impact on the county environment. These macro consequences are lost in the day-to-day planning and construction that happens across the county. As higher densities and infill occur, their effect is cumulative and significant. For example:

1. Small neighborhoods with a stable environmental footprint are being transformed with larger houses. These newer houses bring additional impervious surface through larger roofs and additional pavement. They also displace trees that protect the parcel with a green canopy and provide haven for birds and wildlife. While the effect of a single home is small, the macro effect on community channels more runoff and pollution into the watershed, increases the ambient temperature, and displaces wildlife.
2. Large scale development, such as the Tysons Corner Urban Center and other Suburban Centers, bring additional residential density to a region. This induces disproportionate transportation needs that can lead to congestion and the associated increase in air pollution and vehicular waste. Tools and analysis such as **Transportation Demand Management (TDM)** are being used to plan and focus transportation needs across multimodal systems and to provide mixed use services in close proximity to the density. TDM is a key component to manage this macro effect.

a. Understanding Macro Changes

These macro effects are going to become more pronounced with the county build out and change from development to redevelopment. The infrastructure to sufficiently understand and model their effects is lacking across the county systems. Up to now, regional aggregations and averages

⁸ <http://www.fairfaxcounty.gov/nvswcd/newsletter/greenroof.htm>

⁹ U.S. Department of Transportation, Federal Highway Administration, [A Guide for Hot Lane Development at http://www.itsdocs.fhwa.dot.gov/JPODOCS/REPTS_TE/13668.html](http://www.itsdocs.fhwa.dot.gov/JPODOCS/REPTS_TE/13668.html)

were sufficient to predict development impacts. The Concept Map for Future Development has done a good job guiding decisions and projecting impact at a broad macro level. Moving into the future, tools are necessary to provide a finer resolution of real time changes that can be quickly aggregated into a macro view.

These new tools should combine the county GIS capability with the existing planning and zoning databases. The data are readily available at a parcel level, but the ability to view the data and use the data to model macro effects is not possible. Understanding and modeling the macro changes happening across the county will help provide insight to the Board of Supervisors and Planning Commission as they deal with micro decisions.

b. Creative approaches

The county also needs to consider creative approaches to address these macro effects. One way to avoid macro consequences is to reduce the impact of micro decisions. For example:

1. Modifying the Public Facilities Ordinance to encourage Low Impact Development (LID) can protect streams and mitigate the micro impact of infill development.
2. Providing incentives for Green Building can protect streams and decrease heat generation from asphalt roofs. This encouragement will be a win-win for the county and for developers.
3. High density development should have an effective Transportation Demand Management plan. This should be part of any submission and include future monitoring with options in case the plan deviates from reality. The recent Plan Amendment for Fairlee/Metro West includes TDM as an important element of the development plan.

Planning for large scale redevelopment, such as county Urban and Suburban Centers, has been a useful forum to consider macro effects. These task forces grapple with all aspects of the Urban and Suburban centers, including land-use, transportation, and environmental impact. The residential commitment and input to these studies is commendable. They provide a long range vision and plan in harmony with the community vision. These studies and reports complement the Area Plans Review (APR) process that focuses on micro changes to the comprehensive plan.

The focus on **Transit Oriented Development**, especially at Metro stations and future stations along the Dulles Rail corridor and Tysons Corner, maximizes the county investment in multi-modal transportation. The Board of Supervisors-appointed Tysons Coordinating Committee has a very

ambitious charge to consider the redevelopment of the “Downtown” for Fairfax County. The county has a significant interest in getting Tysons right. Such a large project will demand better tools to envision, model, and explain the plan to citizens and business. It will require substantial community outreach and participation. It will need to be codified into a workable Comprehensive Plan amendment that encourages and monitors the vision. And it will require better macro management and mitigation of changes to this important region.

c. Non-obvious Macro Considerations

The sections above focus on changes caused by development and redevelopment. There are also macro effects generated by non-development changes, such as work patterns, mixed use opportunities, and economic considerations that effect the county environment.

Telecommuting, or **telework**, reduces or eliminates the traditional commute to the office. Teleworkers work from home or at local work centers that provide infrastructure for a community of workers. This reduces pressure on the transportation network without building physical infrastructure. The county has an aggressive Telework program in place for county employees.

Mixed use development brings work, play, and home closer together, reducing the distance for trips and commutes. Mixed use is proliferating across the county, providing economic growth with less congestion than traditional separated communities.

Economic factors, such as increasing property values, also affect the overall county environment. Low-income residents are struggling to find affordable housing near their jobs in the county and frequently choose to live outside the county. This negatively impacts the transportation system. As property values rise, homeowners choose to expand their residences rather than relocate, which changes the impervious nature of communities.

The Board of Supervisors has specifically raised affordable housing and infill development as an environmental concern in their Environmental Vision.

Macro considerations need to be better understood and modeled as the county increases in density. Traditional models did not need to consider macro changes, and the resolution and quality of data is insufficient for planning and protecting our environment. Dealing with the proliferation of small changes across the county will take creative approaches using all available tools, including the Comprehensive Plan, the Public Facilities Manual, special ordinances, and public outreach.

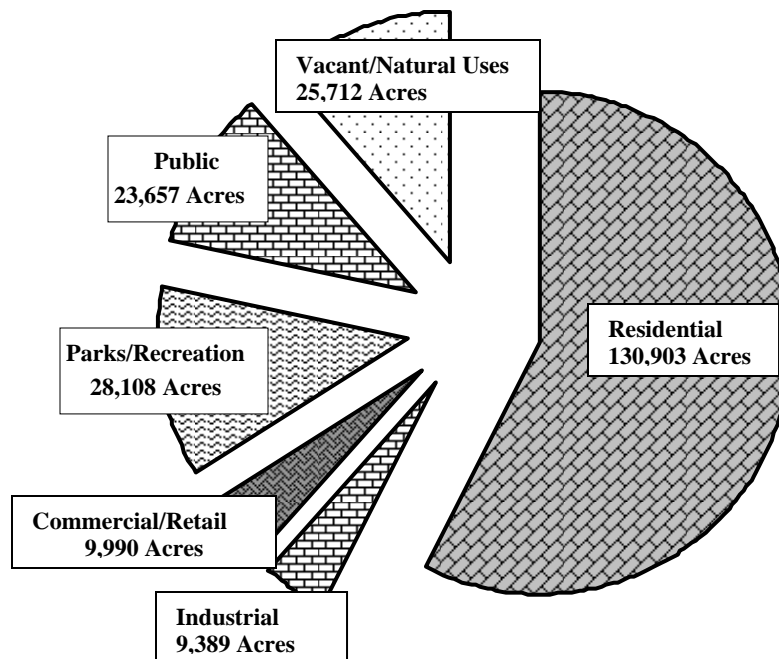
B. LAND USE

A prerequisite to understanding the interrelationship between land use and transportation is to first examine them separately. This section describes land use and land use decision-making in Fairfax County.

1. How Is Land Used In Fairfax County?

Land use in Fairfax County is analyzed yearly via the Urban Development Information System (UDIS). Fairfax County has 227,751 total acres of land, excluding areas in roads, water, or small areas of land unable to be zoned or developed. Those acres are organized into the following broad categories:

Figure I-1: Existing Land Uses in Fairfax County



Source: Fairfax County Department of Systems Management for Human Services, 2004.

Note: Land in Towns of Clifton, Herndon and Vienna included. Total acreage figures do not include areas in roads, water, or small areas of land unable to be zoned or developed.

- Residential—acres dedicated to living. Residential acres are measured by the number of dwelling units per acre (DU/AC). For example, a low-density neighborhood has a DU/AC from .1 to .5, a suburban neighborhood ranges from 1-20, and an urban center has a core DU/AC of 35-60.
- Commercial/Retail—acres developed for people to work or shop. Commercial space is measured by looking at the Floor Area Ratio (FAR), which is the ratio of gross floor area to the size of the lot. For

example, an FAR of 0.5 means that a single story building can cover half the lot, a two-story building can cover 1/4 of the lot, and a four-story building can cover 1/8 of the lot. FAR does not include other impervious surfaces, such as parking lots.

- Industrial—acres zoned for industrial use. Industrial space is measured by FAR.
- Parks and Recreation—acres dedicated to public enjoyment and recreation.
- Public—acres owned by the public but not for parks or recreation. This includes: Fort Belvoir; Dulles Airport; the campus of George Mason University; county government facilities such as fire stations, landfills, police stations, training facilities, schools, and government centers; and other publicly-owned properties.
- Vacant—acres currently unused, either natural or vacant, but zoned for Residential, Industrial, or Commercial uses.

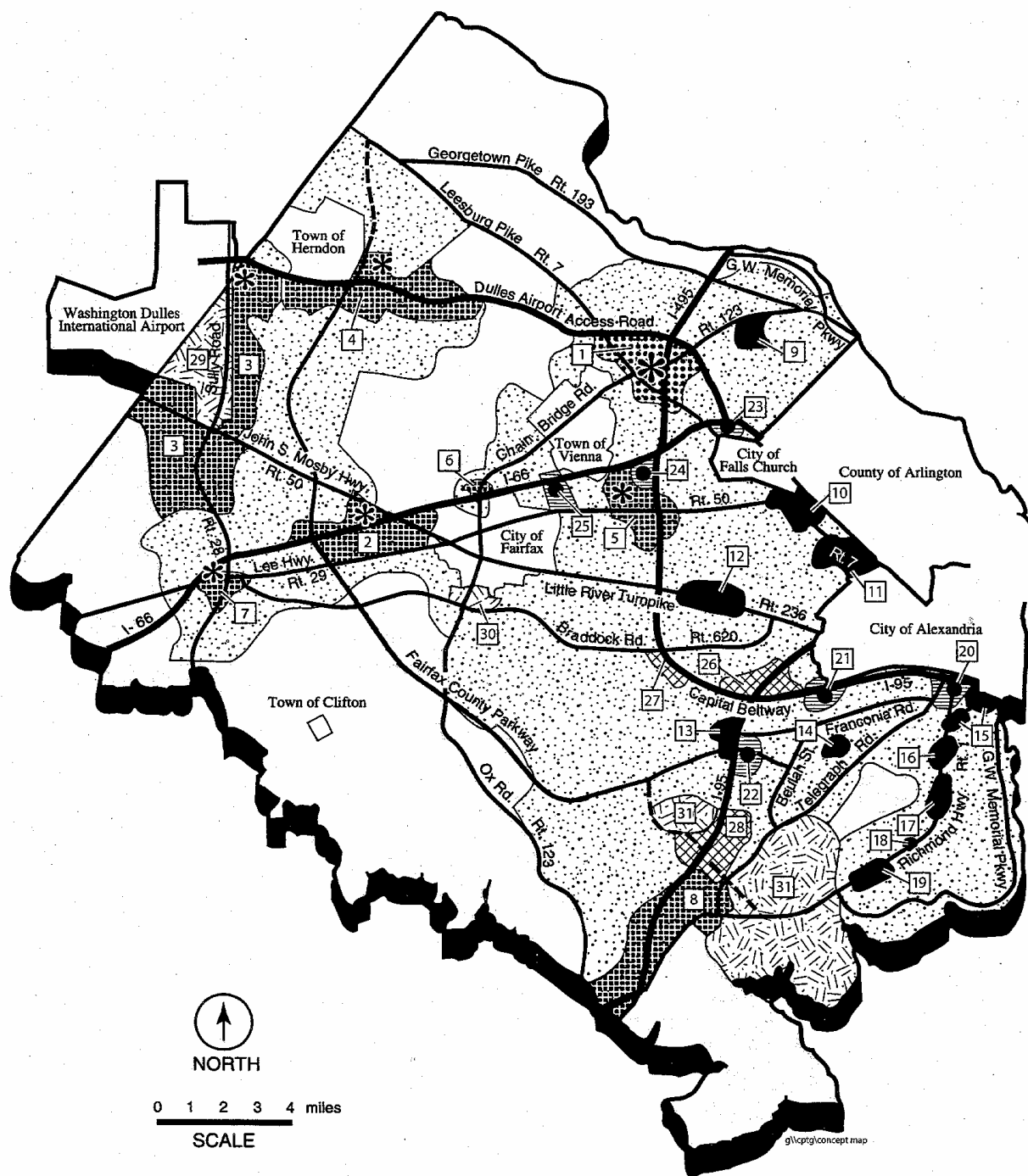
2. Land Use Planning

The Fairfax County Comprehensive Plan is a guide for making land use decisions in Fairfax County. The Plan was adopted in 1975 and revised in 1988 around 18 Goals for Fairfax County (a 19th goal was added later). The 2003 Edition consists of the Policy Plan plus the Area Plan for each of the four planning areas. The Policy Plan has ten functional sections plus a Chesapeake Bay Supplement. The functional sections are: Land Use, Transportation, Housing, Environment, Human Services, Public Facilities, Parks and Recreation, Revitalization, Economic Development, and Heritage Resources.

In 1990, the county's Concept Map for Future Development was developed. This map identified 31 mixed-use centers; the Concept Map has been revised slightly since then, but there are still 31 mixed-use centers shown (Figure 1-2). While the Concept Map was not formally adopted, it is an integral part of the Area Plans.

In 1995, a study of the Plan was prepared entitled: State of the Plan, An Evaluation of Comprehensive Plan Activities Between 1990-1995 with an Assessment of Impacts Through 2010. This study outlined a series of recommendations for the county to improve its ability to meet the Plan goals. Many of those recommendations are still applicable.

Figure I-2: Concept Map for Future Development



CONCEPT MAP FOR FUTURE DEVELOPMENT

CONCEPT MAP FOR FUTURE DEVELOPMENT

LOCATIONS OF MIXED-USE CENTERS

Urban Center

1. Tysons Corner Urban Center

Suburban Centers

2. Fairfax Center
3. Dulles (Route 28 Corridor)
4. Reston-Herndon
5. Merrifield
6. Flint Hill
7. Centreville
8. Lorton-South Route 1

Community Business Centers

9. McLean
10. Seven Corners
11. Baileys Crossroads
12. Annandale
13. Springfield (West)
14. Kingstowne
15. North Gateway and Penn Daw
16. Beacon/Groveton
17. Hybla Valley/Gum Springs
18. South County Center
19. Woodlawn

Transit Station Areas

20. Huntington Metro Station
21. Van Dorn Metro Station
22. Franconia/Springfield Metro Station
23. West Falls Church Metro Station
24. Dunn Loring Metro Station
25. Vienna Metro Station

LOCATIONS OF LARGE INSTITUTIONAL AND INDUSTRIAL AREAS

Industrial Areas

26. Beltway South
27. Ravensworth
28. I-95 Corridor

Large Institutional Land Areas

29. Washington Dulles International Airport
30. George Mason University
31. Fort Belvoir (Main Post and Engineer Proving Ground)

LEGEND



Suburban Neighborhoods
(Residential density ranges defined in Area Plans; 0.15-0.25 FAR* for neighborhood-serving non-residential use)



Low Density Residential Areas
(Residential density of 0.1 to 0.5 du/ac **, specific density ranges in Area Plan; Non-residential use intensity 0.05 to 0.1 FAR)



Tysons Corner Urban Center
Core (1.0-1.65 FAR;
35-60 du/ac)
Non-Core (0.25-1.0 FAR;
8-45 du/ac)



Suburban Centers
Core (0.3-0.8 FAR;
15-35 du/ac)
Non-Core (0.15-0.30 FAR;
5-25 du/ac)



Community Business Centers
(0.20-0.50 FAR; 5-25 du/ac;
if a core is designated,
intensities of up to 0.70
FAR may be allowed)



Transit Station Areas
(0.30-1.00 FAR;
8-45 du/ac)



Industrial Areas
(0.25-0.50 FAR for
Industrial Uses)



Large Institutional Land Areas

* FAR - floor area ratio
** du/ac - dwelling units per acre

Currently, the Policy Plan is reviewed by functional sections. The Parks and Recreation section was reviewed in 2003. The Transportation Section is being reviewed in 2004 and 2005. A comprehensive review of the complete Policy Plan is not anticipated in the future due to the overall complexity of the complete document. The Area Plans are reviewed regularly. The North County Area Plans Reviews started in 2004. The South County Area Plans Review process started in 2005.

Another important ordinance that affects land use is the county's Chesapeake Bay Preservation Ordinance. Amendments to this Ordinance were adopted on November 18, 2003 by the Board of Supervisors. This Ordinance codifies the county commitment to protect the Chesapeake Bay. An important aspect is the designation of Resource Protection Areas (RPAs) around all water bodies with perennial flow. RPAs are the corridors of environmentally sensitive land that lie alongside or near the shorelines of streams, rivers, and other waterways. They include any land characterized by one or more of the following features:

- (1) A tidal wetland;
- (2) A tidal shore;
- (3) A water body with perennial flow;
- (4) A non-tidal wetland connected by surface flow and contiguous to a tidal wetland or water body with perennial flow; and
- (5) A buffer area that includes any land within a major floodplain or any land within 100 feet of a feature listed in (1)-(4).

The Chesapeake Bay Supplement, which was incorporated into the Policy Plan in 2004, provides an excellent overview of land use factors in Fairfax County that affect the Chesapeake Bay.

The Comprehensive Plan plus the Chesapeake Bay Preservation Ordinance provide an outline for how and where development is planned to occur in Fairfax County. They can be used to analyze the **potential** development that can occur within the county. The **realization** of that potential is subject to many external variables.

3. Land Use Monitoring

Information on land use is primarily tracked using the Urban Development Information System (UDIS), which was developed in the 1970s. Background information on UDIS from the 1995 State of the Plan explains, "the Comprehensive Plan had detailed guidance for residential development, with a dozen residential density ranges, but lacked guidance for the appropriate intensities (FAR) for non residential development. Since the 1970s, UDIS has remained relatively unchanged with regard to Plan quantification capability. The Plan has, however, become increasingly complex, with intensity recommendations for most non residential areas."

Recommendations to improve UDIS from the 1995 State of the Plan have not been implemented, and it is still the basis of the county's land use information as presented in *Demographic Reports*. Technologically, UDIS has not kept pace with other county systems that have migrated off the mainframe. Feeder systems that provide data for UDIS are at risk of not being able to provide the correct type and format of data. The county is currently stabilizing UDIS and preparing to review the business requirements for a future upgrade. This is a critical tool for understanding how land is used, and additional capabilities to better categorize and understand the ground truth should be added. It is important that all of the stakeholders in the UDIS system are identified so that different business processes can be integrated. Additionally, a funding source needs to be identified in order for the process of upgrading the system to begin.

Moving forward, EQAC recommends that a parcel based system be developed using Geographical Information System (GIS) technology to replace UDIS. The benefit of such a system crosses beyond the environmental departments. Working with staff to understand the scope of this recommendation, we have identified work to occur in two areas – the integration and sharing of existing data and the creation of new systems to capture critical information not currently available in database form.

Integration and sharing of existing data

- Shared access and linkages to existing data created and maintained by business functions located in different county departments will need to be developed. These linkages should include the creation of a report module that allows users the ability to access and run certain types of reports.
- Current “owners” of parcel-related data at various stages of the parcel's “life cycle” will need to work cooperatively across business functions with other stakeholders to develop shared data definitions and documentation, and to ensure compatibility. As business functions change, compatibility of shared parcel information should be a primary focus of new and redesigned systems.

Creation of new data elements

- For critical parcel information not currently captured in existing databases, new databases should be developed that will integrate with the “life-cycle” application. The updating and maintenance of these new databases need to be integrated into the business processes of organizations functionally responsible for the processes to ensure that they reflect real time information.

- Data elements of particular interest to EQAC that currently are not fully captured in database formats include:
 - Planned land use and options;
 - Planned commercial and industrial intensity;
 - Existing and planned mixed-use types and intensity; and
 - Environmental data such as impervious surfaces, tree cover, streams, and stream channels.

Until a parcel life-cycle system can be deployed, parcel information needs to remain part of the business process of each business area and needs to be robustly maintained by that business area in order to maintain the continuity of critical information in the county.

4. Land Use History and Buildout Projections

The Comprehensive Plan contains land use recommendations for all of the land in the county. As a practical tool, however, it is most effective when there is significant vacant land to be developed. That vacant land has been steadily decreasing as shown in Table I-1:

Table I-1 Vacant Land in Fairfax County			
Year	Vacant Land (acres)	Total Planned Land (acres)	% Vacant
1980	75,550	234,744	32.2%
1985	66,685	232,941	29.2%
1990	45,042	230,678	19.5%
1995	37,006	229,366	16.1%
2000	29,529	228,541	12.9%
2004	24,307	227,751	10.7%
Planned land does not generally include public roads and water			
Source: Fairfax County Demographic Reports, 2004			

In 1990, when the Concept Map was created, approximately 20% of the county was vacant. This gave some flexibility to the planners. In 2004, with only approximately 11% vacant and much of that fragmented, the decisions are much more constrained. Significant planning changes require interventions that will most likely affect existing developed land.

The current land use categories are shown in Table I-2 below.

Currently, 57.5% of the county land is developed for residential use, with 4.4% for commercial. These numbers show the footprint of each use type, but they

do not show the corresponding density. Commercial/Retail acreage in the county has a higher density than residential. It is difficult to determine the footprint of mixed-use acreage given the current data. It is also difficult to determine mixed-use density, and whether it is a function of DU/AC or FAR, or both.

Table I-2 Existing Land Uses		
Land by existing use	Acreage	Percent of total
Residential	130,903	57.5%
Industrial	9,389	4.1%
Commercial	9,990	4.4%
Parks and Recreation	28,108	12.3%
Public	23,657	10.4%
Vacant & Natural	25,712	11.3%
Total	227,759*	100.0%
*Does not generally include public roads and water		
Source: Fairfax County Demographic Reports 2004		

As the current Plan is exercised and the county reaches build-out, the planned land use acreage is shown in Table I-3. All vacant and natural land will be developed or become parkland. The ratios between the types will change, with the residential increasing to 63% overall.

Table I-3 Planned Land Uses				
Land Use	Planned Acreage	Percent of Total Land in the County	Vacant/Underutilized Land	Vacant Land as % of Planned Acreage
Residential	143,496	63.0%	22,505	15.7%
Industrial	8,290	3.6%	2,326	28.1%
Commercial	5,259	2.3%	710	13.5%
Public Facilities and Mixed Use	26,725	11.7%	1,356	5.1%
Parks, Recreation, Floodplains	43,852	19.3%	3,779	8.6%
Vacant and Natural	-	-		
TOTAL	227,622	100.0%	30,676	13.5%
Source: Fairfax County Demographic Reports, 2004				

The table also includes an estimate of the vacant or underutilized acreage within each type. “Because of the complexities involved in determining whether nonresidential land is underdeveloped, estimates of underdeveloped acreage are only made for residential land.”¹⁰

5. Plan Density Increases

The aggregate acreage available in the county is relatively constant, with occasional changes as land is converted to other uses, such as roads and drainage ponds. The Comprehensive Plan capacity, however, is constantly increasing as new density is allocated across the county. For purposes of allowing for a comparison of existing and planned development levels, Table I-4 shows the “existing conditions” for both nonresidential and residential development as they existed in Fairfax County in the years 1990, 1994, and 2002.

Table I-4			
Existing Land Uses in Fairfax County: 1990, 1994, and 2002			
Land Use	1990	1994	2002
Nonresidential (figures given in square feet of floor space, rounded to the nearest million)			
Office	67,000,000	75,000,000	98,000,000
Retail	33,000,000	39,000,000	47,000,000
Institutional	29,000,000	31,000,000	37,000,000
Industrial	34,000,000	36,000,000	40,000,000
Total Nonresidential	163,000,000	182,000,000	221,000,000
Residential (figures given in dwelling units, rounded to the nearest hundred)			
Single Family Detached	163,000	169,700	184,200
Single Family Attached (e.g., Townhouses)	67,300	74,600	90,500
Multifamily	72,100	77,700	96,000
Total Residential	302,500	322,000	370,600
Source: Fairfax County Department of Planning and Zoning, 2004			

¹⁰ Fairfax County Demographic Reports, 2004

Residential and nonresidential growth in Fairfax County is expected to continue, and the county's Comprehensive Plan anticipates and guides this growth. Table I-5 presents one potential Comprehensive Plan "buildout" scenario based on Comprehensive Plan options that would serve to maximize residential development (as opposed to options that would maximize nonresidential development) in mixed use employment centers. This scenario is presented applying Comprehensive Plan guidance as it existed in 1989, 1991, 1995, and 2003. Prior to the Area Plan revisions in 1991, nonresidential potential could not be quantified due to lack of specific nonresidential development intensity guidance in the Comprehensive Plan; as such, nonresidential Plan capacity information is not provided for the year 1989.

Table I-5 Comprehensive Plan "Buildout" Capacity in Fairfax County Applying a Residential Plan Option Maximization Scenario				
Land Use	1989	1991	1995	2003
Nonresidential (figures given in square feet of floor space, rounded to the nearest million)				
Office	-	158,000,000	182, 000,000	185, 000,000
Retail	-	48, 000,000	56, 000,000	65, 000,000
Institutional	-	37, 000,000	42, 000,000	44, 000,000
Industrial	-	74, 000,000	75, 000,000	70, 000,000
Total Nonresidential	-	317,000,000	355,000,000	364,000,000
Residential (figures given in dwelling units, rounded to the nearest hundred)				
Single Family Detached	216,100	212,200	212,800	215,200
Single Family Attached (e.g., Townhouses)	78,600	82,700	86,200	88,900
Multifamily	83,200	114,400	140,600	153,500
Total Residential	377,900	409,300	439,600	457,600
Source: Fairfax County Department of Planning and Zoning, 2004				

The Comprehensive Plan is not a static document; major revisions to the Area Plans were adopted in 1991, and the Plan has been amended numerous times, both through the Area Plans Review (APR) process and through Out-of-Turn Plan Amendments, since that time. As can be seen in Table I-5, the general effect of these Plan amendments has been to increase potential development in Fairfax County; the "buildout" levels of total residential and total nonresidential development under the scenario presented in Table I-5 have increased since 1991.

The increase in buildout planned residential development levels, under the scenario presented in Table I-5, is summarized in Table I-6:

Table I-6 Residential Development : Plan Build Out, 1989-2003						
Land Use	1989 Plan	1991 Plan	1995 Plan	2003 Plan	1989 - 2003 Change	1989 - 2003 Percent Change
Single Family Detached	216,100	212,200	212,800	215,200	(900)	-1%
Single Family Attached	78,600	82,700	86,200	88,900	10,300	13%
Multifamily	83,200	114,400	140,600	153,500	70,300	84%
Total	377,900	409,300	439,600	457,600	79,700	21%

Table I-6 clearly shows that the residential units are:

1. Increasing in total number—as the population grows, Fairfax County is able to expand through Plan changes that increase the number of potential units; and
2. Getting closer—the trend is to add more multi-family units (an 84% increase since 1989) while maintaining a consistent number of single family detached homes.

C. TRANSPORTATION

This section examines transportation and transportation decision making in Fairfax County.

1. How do People and Things Move About Fairfax County?

There are numerous options for people and things to move about the county.

- Private, motorized transportation is one of the most significant elements of transportation that has a major effect on the environment and is most closely related to land use and development. In modern times, people have become more reliant on the use of automobiles for business, pleasure, and various daily functions and activities. The urban sprawl we have experienced in Fairfax County has greatly influenced this problem, causing major congestion on roadways, particularly during rush hour as many individuals are commuting long distances to and from their jobs.

- Rail and rapid bus transit has long been looked upon as a means of reducing traffic congestion and thereby creating a positive impact on pollution and air quality. It also has a direct relationship to land use planning and development because rail transport centers are ideal locations for business and housing developments. There are numerous projects that have long been in the planning phase; due primarily to budget constraints, however, virtually none of them have reached the actual development phase.
- Commercial vehicular transportation, mainly trucks and buses, are another serious factor impacting our environment. Trucks, whether they are local, inter-county, or interstate, are serious contributors to our environmental crisis. In addition to many of them using “dirty” diesel fuel, they also have a negative impact on traffic congestion. Bus traffic includes school buses, most of which are transporting students during rush hour periods. Many of these buses are old and are a hazard to the environment, again because of the type of fuel they use.
- Non-motorized transportation opportunities, namely walking and biking, have been looked upon as viable alternatives for reducing traffic congestion and improving air quality. Not having sufficient infrastructure for walking and biking is a major deterrent to that form of transport, not to mention the frame of mind of the general public that has become automobile-dependent over the years, even for short trips. This component has an important relationship to land use planning and development in order to ensure that adequate facilities (walking and biking trails) are included in the plans.
- “Virtual transportation” has surfaced in recent years as another viable alternative to motorized transportation. Modern technology has created opportunities for people to work out of their homes, using computers for telecommuting and e-commerce to perform their jobs. If these techniques become a more widely accepted means of performing one’s job, it would have a significant positive impact on reducing pollution and improving air quality.

Fairfax County is a leader in this field with the Fairfax County Government Telework Program.

2. Vehicular Congestion and Volume to Capacity Ratio Maps

This section examines vehicular transportation options and the associated congestion that is experienced every day by drivers. Vehicle congestion on roadways is typically measured by volume to capacity (V/C) ratio. The Fairfax County Department of Transportation’s Planning Division created a map for this report that shows the current and projected V/C ratios on major Fairfax

County roadways. As V/C increases from zero to one, the volume approaches the road capacity. Over one, there is more volume than the road can support. The Level of Service (LOS) is a measure of congestion; once V/C reaches one, the road is fully saturated, and the LOS is graded an F for failing.

Current V/C ratios on county highways are shown in Figure I-3. Major portions of the Beltway, I-66, and the Fairfax County Parkway already have a failing LOS.

Projected V/C ratios for 2025 are shown in Figure I-4. This information considers population growth and settlement projections. Comparing the current V/C ratio map with the future V/C ratio map provides many insights into how the transportation infrastructure grows with population. Some observations:

1. The failing highways are still failing, some much worse and others actually better:
 - I-66 West of the City of Fairfax will get increasingly more congested, while I-66 east of Fairfax will get less congested.
 - The Beltway will become considerably more congested, with V/C ratios ranging from 1.5 to over two. Congestion in the “mixing bowl” area (the I-95/I-395/I-495 interchange area) will continue to get worse. The impacts of the reconstructed mixing bowl are not yet factored into the model; however, interchanges are modeled separately from segments and the data may not reflect the current improvements.
 - I-95 outside the Beltway will get significantly worse, with V/C ratios increasing from 1.01-1.04 to 1.76 or greater.
2. Major roads closer to Washington D.C. will not change considerably over this period. This includes Route 29, Route 50, and Route 7 in and east of Tysons Corner. The current congestion has stabilized and increased volumes are not expected on these roads.
3. Major roads in the western part of the county will get more congested; this includes portions of Routes 28, 123, and 7 west of Reston. This will primarily be induced by commuters from outside the county.

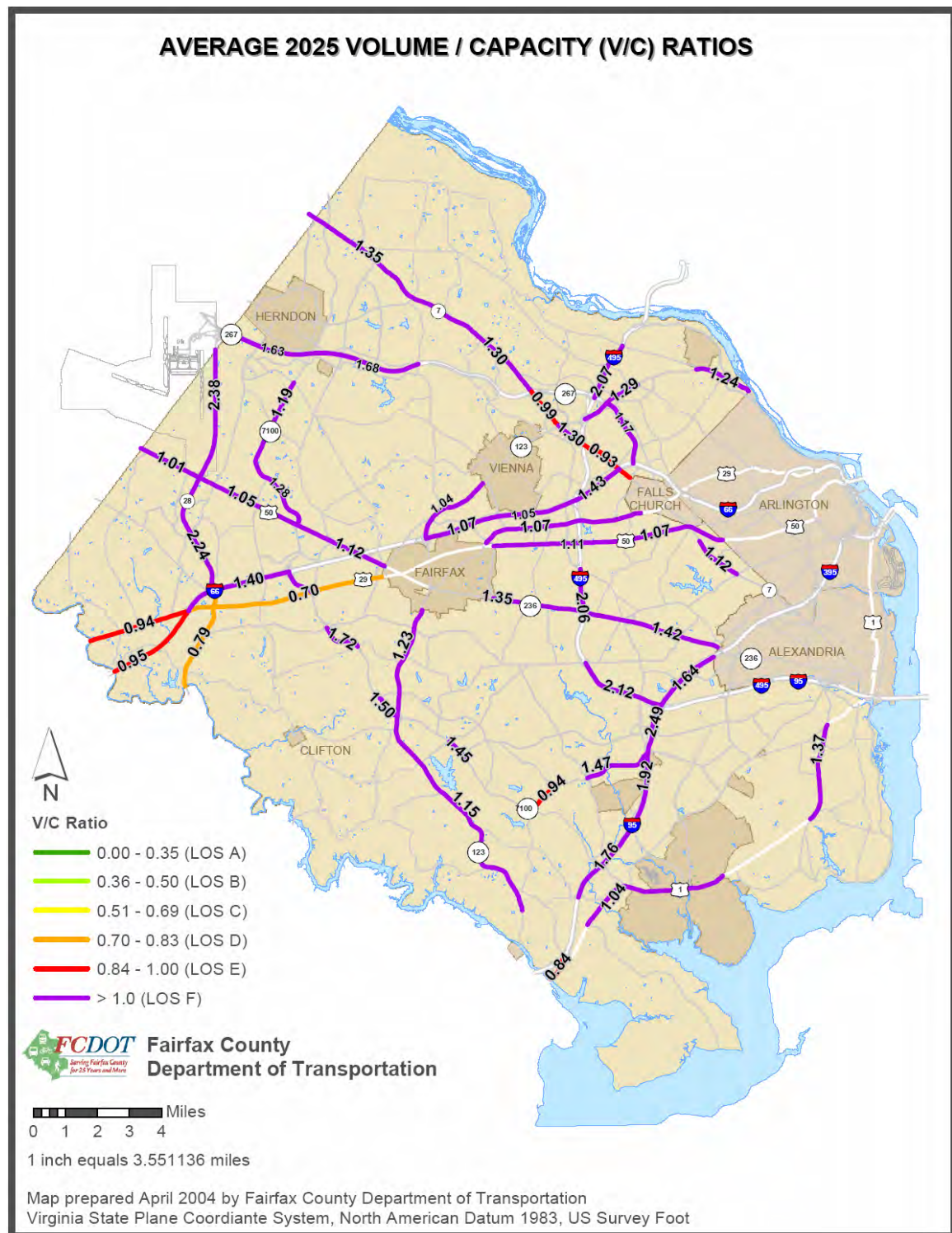
The maps do not include potential improvements from mass transit. In particular, the Dulles Rail extension will impact congestion in the Tysons Corner area, and an Orange Line extension to Centreville will impact congestion along I-66 throughout the county. The maps also do not show changes from the proposed HOT lanes on the Beltway.

Figure I-3:
Average Volume/Capacity V/C Ratios -
Existing Peak Hour Conditions (2002)



Source: Fairfax County Department of Transportation

Figure I-4:



Both of these improvements have a dynamic component and are more difficult to model accurately. One of the recommendations of this Chapter is to continue studies to better model the effect of transit on congestion and other dynamic aspects of a modern transit system. These improvements are being considered as part of the Transportation Section review of the Comprehensive Plan that is currently under way; the improvements need to be implemented to provide the Board with better data to make future transportation decisions.

Frequently the focus of transportation congestion is on big projects, such as the mixing bowl or HOT lanes. This needs to be balanced with regular maintenance of the existing infrastructure. An important policy identified by the Coalition for Smarter Growth is “fix-it-first” to ensure that all state maintenance needs are met and to direct funding to fixing problems on existing roads and transit prior to funding new construction.¹¹ As infill becomes the primary mode of development, the existing infrastructure will demand more resources to accommodate denser developments.

3. Residential Commuting

An interesting statistic on commuter patterns is that over 50% of the residents in Fairfax County work in Fairfax County (see Table I-7), with another 17% working in the District of Columbia. Similarly, most of the workers in Fairfax County live in Fairfax County (see Table I-8); however over 80,000 workers commute to jobs in Fairfax County from Prince William and Loudon Counties. Only 12,000 workers commute to the county from the District of Columbia.

Table I-7		
Where do Residents of Fairfax County Go to Work?		
<u>Destination</u>	<u>Number of Commuters from Fairfax County</u>	<u>Percent of Total Commuters from Fairfax County</u>
Fairfax Co, VA	278,064	52.72%
District of Columbia	88,908	16.86%
Arlington Co, VA	48,670	9.23%
Alexandria City VA	27,641	5.24%
Montgomery Co, MD	16,943	3.21%
Loudoun Co, VA	16,420	3.11%
Fairfax City, VA	15,741	2.98%
Prince George's Co, MD	9,594	1.82%
Prince William Co, VA	7,013	1.33%
Falls Church City, VA	4,061	0.77%
Source: U.S. Census Bureau, Commuting Patterns of Fairfax County, Virginia Residents, 2000 ¹²		

¹¹ <http://www.smartergrowth.net/vision/regions/region.html>

¹² <http://www.fairfaxcounty.gov/comm/demogrph/publist.htm>

**Table I-8
Where to Workers in Fairfax County Come From?**

<u>Origin</u>	<u>Number of Commuters</u>
Fairfax Co, VA	278,064
Prince William Co, VA	44,322
Loudoun Co, VA	35,933
Montgomery Co, MD	22,148
Arlington Co, VA	20,476
Prince George's Co, MD	18,258
Alexandria City, VA	14,643
District of Columbia	12,244
Stafford Co, VA	7,249
Fauquier Co, VA	5,499
Manassas City, VA	5,145
Source: U.S. Census Bureau, Commuting Patterns of Fairfax County, Virginia Residents, 2000	

4. Transportation Options

Just as the Land Use plan has increased capacity in the same footprint through higher density, the transportation plan needs to accommodate more commuters through denser transportation options. Metro is a good example of denser transportation in a smaller footprint.

As a simple example of the space required for vehicular traffic, consider the Fairfax County Parkway. The 35 miles of paved roadway consume roughly:

$$35 \text{ miles} * 5,280 \text{ ft/mile} * 4 \text{ lanes} * 14 \text{ ft/lane} = 10,348,800 \text{ ft}^2 = 237 \text{ acres}$$

This does not count medians or access roads. For comparison, the Pentagon covers 29 acres, or 1/10th the total paved surface of the Parkway. A similar Metro right of way is a much thinner with a higher peak capacity. As the county continues to grow, a multi-modal network that continues to increase density and maximize existing infrastructure is needed.

One successful multi-modal option that is already making a difference is the Burke Virginia Railway Express (VRE) subscription bus route. This is a subscription service that picks up commuters and gets them to the VRE station. The key to such a service is that it makes connections and is consistent.

Additional options that use creativity and provide effective multi-modal options are needed across the county. Combining multi-size buses, pedestrian options, and public outreach into a systematic plan will be needed to keep the county moving.

5. Transportation Decision Making

Management of transportation to maximize its usefulness and minimize its adverse impact on the environment is made very difficult because of the complex interrelationships of federal, state, regional, sub-regional, and local entities that are all involved in Fairfax County transportation planning and funding. Local initiative in addressing transportation needs is further limited because the State of Virginia owns and maintains every public road in the county. Even subdivision cul-de-sacs are State roads.

The complexity of solving transportation problems in Fairfax County and mitigating the adverse environmental impact of inadequate or less than optimum projects can be better visualized by reading the Northern Virginia Transit Funding Resource Guide issued by the Northern Virginia Transportation Commission. This Resource Guide describes the many sources of funds that are available for transit projects and lists over 50 federal and 30 state and local funding programs. However, with governments at all levels being faced with a severely reduced capability to fund projects, they cannot provide funding levels to qualify for matching grants of funds from many of these sources.

A variety of funds are available from the federal government, but they all come with strings attached. Federal regulations, standards, and guidance must be met before consideration will be given as to whether federal share contributions will be made available toward transportation needs.

In Virginia, the Commonwealth Transportation Board (CTB) has final approval authority over the six-year transportation program for the entire State. Under guidance of the CTB, the Virginia Department of Transportation (VDOT) is responsible for building, maintaining, and operating the State's roads, bridges, and tunnels.

For Fairfax County, the transportation goals are included in, and promulgated through, the Fairfax County Comprehensive Plan. Those projects that are to be funded by county resources are included in the county's Capital Improvement Program. However, transportation projects that are to be funded through State and Federal funding are included in the VDOT six-year transportation program.

The Northern Virginia Transportation Coordinating Council has developed a Northern Virginia 2020 Transportation Plan, which is a comprehensive study identifying a multi-modal transportation solution to provide safe, efficient and economical choices for travel and transport of goods. The Plan has become part of the broader planning effort of the Transportation Planning Board of the Metropolitan Washington Council of Governments (TPB of COG). Specific projects will be submitted by the Commonwealth of Virginia for inclusion in Washington region's financially Constrained Long Range Plan (CLRP) as funding streams open up.

A further description of the interplay of planning and funding of projects between agencies in the Metropolitan Washington area can be found in A Citizens Guide to Transportation Decision-Making in the Metropolitan Region, which is available from the TPB of COG.

An example of a coordinated project is the Pike Transit Initiative, which is a 12-month study effort sponsored by the Washington Metropolitan Area Transit Authority (WMATA). The study will analyze alternatives for a new high-capacity and environmentally friendly transit service along Columbia Pike from the Pentagon/Pentagon City area to Baileys Crossroads. Working closely with local jurisdictions, neighborhoods, and community groups, the study team will develop a preferred transit investment (e.g., light rail, streetcar, or bus rapid transit) for the corridor that will support the county's redevelopment initiatives.

6. Programs, Projects, and Analyses

a. Walking and Biking Facilities

There are many potential environmental improvements that can be brought about by providing greater opportunities for non-motorized means to commute, travel, or obtain recreation. They include: reducing air pollution caused by traffic congestion; reducing water pollution caused by roadway and parking lot construction made necessary by traffic demands; reducing noise pollution caused by on-road vehicles; and reducing energy consumption required to operate motorized vehicles.

Improved non-motorized transit access by connecting hike/bike paths to the Metro stations and bus stops was one of the major considerations for the 2002 update of Fairfax County's Countywide Trails Plan. The Non-Motorized Transportation (Trails) Committee (NMTC) continues to improve the trail connections to transit facilities by working with Metro (WMATA), the Virginia Department of Transportation (VDOT), and the county's Department of Transportation (FCDOT), and will review and provide comments during the Dulles Corridor rapid transit stations access planning process. In addition, the FCDOT is conducting a study to inventory and improve bus stop access and safety. The county's Pedestrian Program Manager should review and comment on Metro station studies and the related rezoning and special exception applications to improve the pedestrian access and safety to those facilities. Convenient and safe pedestrian access will encourage more people to use transit facilities, therefore reducing vehicular usage and related pollution in the environment.

In the past, the Board of Supervisors has provided funding to the NMTC by magisterial district for trail projects. Such funding has been limited due to budget reductions. However, in 2004, county voters approved a \$165 million General Obligation Bond Referendum as part of the Board's four-

year Transportation Plan. Within the Plan, \$10.8 million was designated to fund countywide pedestrian improvements such as sidewalks and trails, and improvements for bus stops and crosswalks, as well as pedestrian improvements for the Richmond Highway Initiative.

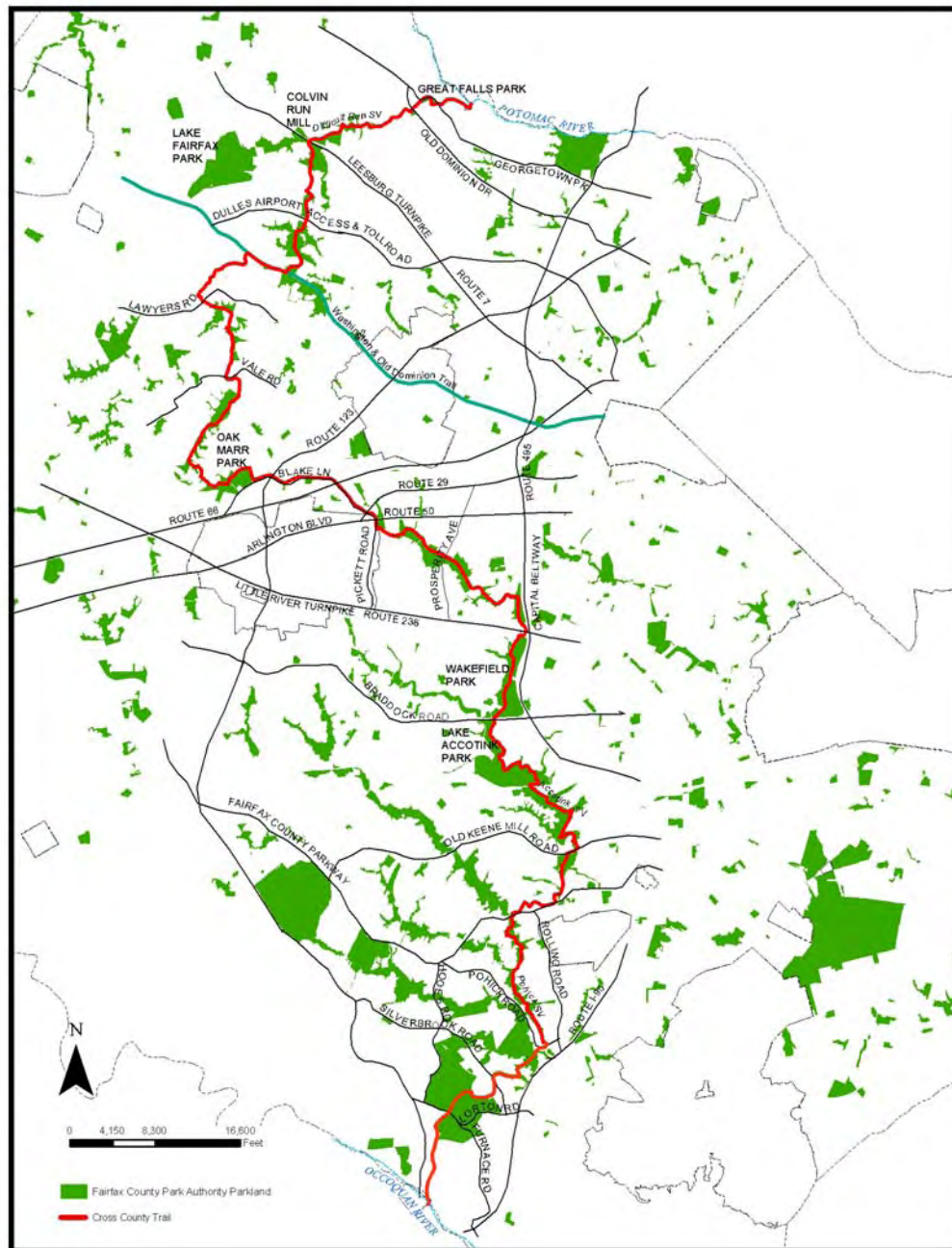
Also, the Board appropriated an additional \$2.5 million in general funds as part of the FY 2005 budget for streetlight, drainage, sidewalk, trail, and walkway projects. Of this amount, \$676,000 was earmarked for sidewalk and trail construction. As there are still numerous missing links along the major commuting and recreational trails in the county, both the NMTC and the Pedestrian Task Force are currently developing a list of priority projects needed to achieve a comprehensive interconnected trails system throughout the county. The Pedestrian Task Force expects to complete a 10-year capital plan for pedestrian facilities in 2005.

The Countywide Trails Plan added on-road bike routes as a new category of trails. These trails are proposed along routes suitable for commuting, and for travel to places for recreational purposes. It is expected that the planned on-road bike routes will be installed with future highway improvements according to the Trails Plan. Currently, there are on-road bike lanes located on Dranesville Road and sections of Beulah Road and Telegraph Road.

The Countywide Trails Plan is developed to provide the general locations of the proposed trails. It does not provide details such as intersection design or mid-block crossing of the street. Those details are examined during the site plan or subdivision plan review process. The site reviewer may need additional training to better detect more of the needs for safe crossing, or seek advice from the county's Pedestrian Program Manager.

The dream of a multi-use trail crossing Fairfax County from the Occoquan River near Route 123 to the Potomac River at Great Falls is becoming a reality. The Cross-County Trail (CCT) will ultimately be 34 miles long and is 95% complete (Figure I-5). Only a few stream crossings are missing, mostly in the northern part of the county. The commuting routes are complete except for the section between King Arthur Road and Route 236 in Fairfax. Work will be started on the Laurel Hill extension with much work to be completed during FY 2006. The connections to the Washington & Old Dominion trail – a great regional transportation and recreation trail – and to the Vienna Metro Access trail at the City of Fairfax, will provide vital links to transportation systems across the region. A link is also provided to the Franconia-Springfield Metrorail station. Other connections, such as to the Fairfax County Parkway trail, the Reston trail system, and various roadside trails will allow trail users to reach work, shopping, recreation, and school destinations without resorting to the automobile. With rising gasoline prices, more residents will likely be turning to bicycle and other alternative modes of transportation in the future.

Figure I-5: Cross-County Trail



Source: Fairfax County Park Authority

b. Employer Services Program

Fairfax County has a teleworking option for the county staff. An even more significant application of teleworking or telecommunication is part of the county's Employer Services Program. The Fairfax County Employer Services Program (ESP) was established in 1997; its basic purpose is to work with employers to provide alternative means of commuting to their places of employment. These alternatives include Metro/rail, bus services, carpooling, vanpooling, telecommuting, bicycling, and walking. ESP provides various services to employers to enable them to implement any of the above-mentioned alternatives.

The increased publicity on teleworking has resulted in an increase in the number of teleworkers, from 138 in December 2001 to over 825 today. The county is well beyond the three-quarters mark towards its goal of 1,000 teleworkers (a number that is based on the Council of Government's goal of 20% of the regions' eligible workforce teleworking by 2005). When Fairfax County reaches that goal, it is estimated that county teleworkers will save 59,000 commuting hours and 1.8 million commuting miles in a year.

In February 2004, Fairfax County Board Chairman Gerald Connolly, the Metropolitan Washington Council of Governments, and the Greater Washington Board of Trade announced a new effort to encourage 50,000 more commuters to telework by 2005. This program, which is aimed at large employers and federal agencies, includes customized training programs and free trials at telework centers and marks the first time that public and private organizations in the metro area have come together to promote teleworking.

In October 2004, a very successful Washington Area Conference on Telework (WACOT) Senior Executive's Forum was held in Tysons Corner. Participants, including Chairman Gerald Connolly, Board of Trade President Bob Peck, Bill Lecos from the Fairfax County Chamber of Commerce, Delegate Jim Scott, representatives from COG, and corporations in Fairfax County and the region kicked off a major effort to enlist the private sector in the project to meet the region's telework goal.

Fairfax County government, through its Employer Services Program, assists businesses and employees to find transportation solutions, including telework programs. During 2004, Employer Services Program staff conducted a number of employer site outreach visits throughout the county. A description of the Employer Service Program can be found on the county's Web site at: <http://www.fairfaxcounty.gov/fcdot/Employer.htm>.

The support from the Board of Supervisors and the County Executive, plus the marketing and training campaign and technology enhancements, are

working. Increased interest in telework is evident in the number of employees who participate in training sessions, ask for information via email and phone, and sign up for telework. There are now teleworkers in departments that previously had none. Managers have expressed an interest in telework as a way to continue business operations during inclement weather or emergencies. The county's active partnership in regional efforts to expand telework keeps it current on best practices and identifies the county as a resource for other businesses on teleworking.

D. THE INTERRELATIONSHIP BETWEEN LAND USE AND TRANSPORTATION

The above sections presented "Land Use" and "Transportation" as separate environmental issues. The focus of this section is on the interrelationship between land use and transportation. Throughout this chapter, three fundamental observations about Fairfax County have been examined. They are:

1. The county is rapidly approaching build-out and is transitioning from a growth focus to redevelopment;
2. The county transportation systems are strained by congestion and getting further constrained by sprawl beyond the county; and
3. The county will continue to grow in population and prosperity. It needs to provide residential, commercial, and transportation options for more people.

As the concept plan becomes realized, the transportation infrastructure must be in place to accommodate those new living and working populations. With the county reaching build-out, the transportation options are constrained. Dense options, such as Metro and HOV, are enablers of future growth. Alternatives and choices, such as mixed use development, transit oriented development, telecommuting, and flex-work, reduce the amount of transportation that is required.

Combining the land use projections with transportation planning is essential for the county to continue to grow and prosper. By considering the land use and transportation facets of future decisions together, the county can continue to maintain a high quality of life. Conversely, when land use or transportation decisions are made in isolation, they will exacerbate the problems of build-out and congestion and negatively impact quality of life.

The county has already started along this path with the designation of Urban, Suburban, and Transit centers. The Board of Supervisors has adopted Comprehensive Plan guidance for several such areas based on the recommendations of Board-appointed task forces. The comprehensive results of these efforts have been impressive, and EQAC anticipates similar results from ongoing and future task

force efforts. Equally important are policy changes that encourage more comprehensive planning, such as Transportation Demand Management.

1. Programs, Projects, and Analyses

This section outlines projects that have combined elements of land use and transportation via special studies or revitalization districts that incorporate mixed use and transit oriented development.

The establishment of Urban Centers, Suburban Centers, and Transit Station Areas (as shown in the Concept Map for Future Development) in critical locations in the county is a fundamental prerequisite to achieving many of those objectives. Significant effort is now focused on the Tysons's Corner Urban Center, where plans call for four additional Metro stations. By preparing and planning for future development, the county is making progress towards integrating land use and transportation.

a. Tysons Corner Urban Center

Over the last several decades, Tysons Corner has evolved from a rural crossroads into a substantial suburban business center. The Comprehensive Plan recognizes Tysons Corner as the only area in Fairfax County that is classified as an Urban Center. The Comprehensive Plan envisions a Tysons Corner Urban Center that contains a mixture of high density office, retail, and residential uses and parks (including urban parks and active recreation facilities) in a pedestrian-oriented urban environment.

As envisioned in the Comprehensive Plan, the highest development intensities and the most "urban" areas of Tysons Corner will be located within walking distance of future rail stations. Under the Comprehensive Plan, locating rapid rail transit stations in Tysons Corner will allow increased intensity for non-residential and residential development for areas in proximity to each station.

In order to provide a comprehensive plan for Tysons Corner, the Board of Supervisors established the Tysons's Corner Coordinating Committee in May, 2005. The Joint Board Matter that established the committee clearly identified growth, land use, and transportation as the focus of the committee:

*Tysons Corner is the economic engine driving Fairfax County to and through the 21st Century, and the conditions established by this Comprehensive Plan update **must** continue to foster the economic vitality of our urban center. The continued commercial success of Tysons plays a major role in providing enough revenue to allow the Board to keep providing tax relief to homeowners. The residents of Fairfax County cannot afford an economic decline in Tysons Corner,*

and this must be foremost in our thoughts. In addition, Tysons needs a better mix of residential and commercial development in order to mitigate traffic congestion. Tysons must also remain a center for retail activity.

Mission: *With this goal in mind, the mission of the Tysons Coordinating Committee is to update the 1994 Plan to:*

- 1. Promote more mixed use;*
- 2. Better facilitate transit-oriented development (TOD);*
- 3. Enhance pedestrian connections throughout Tysons;*
- 4. Increase the residential component of the density mix;*
- 5. Improve the functionality of Tysons, and;*
- 6. Provide for amenities and aesthetics in Tysons, such as public spaces, public art, parks, etc.*

Scope: *The scope of the Committee's charge is to:*

- 1. Focus on transit nodes;*
- 2. Folding the APR nominations into this process;*
- 3. Ensure that transportation impacts are addressed;*
- 4. Help define the future of Tysons*

The committee will continue for 15 months, with significant community outreach and public involvement. EQAC is represented on the committee and will advocate for strong environmental protections within and around Tysons Corner.

b. Dulles Corridor Rapid Transit Project

Rail service has been envisioned in the Dulles Corridor since construction of Washington Dulles International Airport in the late 1950s, when the right-of-way for future rail was reserved in the median of the Dulles Airport Access Road. The Fairfax County Comprehensive Plan integrates land use and transportation planning for the area from Tysons Corner to Dulles Airport based on the expectation that rail service through Tysons Corner to Dulles Airport will be constructed. It is critical that the Dulles Rail project be funded and constructed if those plans are to be realized.

The Draft Environmental Impact Statement (EIS) for the Dulles Corridor Rapid Transit Project includes an option to commit to rail service in the corridor without interim steps, including bus service in lieu of rail. The Draft EIS also includes options for serving Tysons Corner with rail, while the bus rapid transit options would bypass Tysons Corner. It is essential that, if the land use and transportation objectives for this critical corridor are to be realized, rail service must be provided and Tysons Corner, as the

designated urban center of Fairfax County, must be served by that rail service. While it is important to implement rail service in the corridor, it is also important that issues that were overlooked or not fully evaluated in the Draft EIS be considered and resolved in a manner consistent with the goals and objectives of the Comprehensive Plan. The issues that need further evaluation and consideration include: (a) the noise that will be generated from rail service, especially at elevated tracks, as well as from the additional vehicular traffic that will be generated along the corridor; (b) the increased need for feeder bus service centering on the transit stations; (c) the impact on surrounding neighborhoods of increased densities that can be granted in the vicinity of rail stations; (d) the increased traffic, and its impact, from development generated by the availability of rail service; and (e) adequate provision for pedestrian access to transit stations.

c. Suburban Centers

The county has designated seven areas as Suburban centers. These contain a complementary mixture of office, retail, residential uses and parks (including Urban Parks and active recreation facilities) in a cohesive, moderate intensity setting. The Reston and Merrifield Suburban centers are presented as representative of the comprehensive approach at each area.

Reston Suburban Center: The purpose of the plan for the Reston Suburban Center area is to encourage a more urban and transit-oriented development pattern. The objective is to create, at each Transit Station Area, a pedestrian-oriented core area consisting of mixed-use development that includes support services while maintaining transitional areas at the edges of the Transit Station Area.

Options for development in the Transit Station Areas allow higher intensities based upon compliance with specified conditions. Those options are designed to be site specific.

The Merrifield Suburban Center: On June 11, 2001, the Board of Supervisors adopted an amendment to the Comprehensive Plan that created the Merrifield Suburban Center. The area is served by the Dunn Loring – Merrifield Metro station and has regional and local access from I-66, I-495, Route 29, Route 50, and Gallows Road. As set forth in the Comprehensive Plan, the vision for the Merrifield Suburban Center includes two core areas: one focuses on development near the transit station and the second is planned to evolve into a town center. A new “Main Street” would connect the two core areas. The interrelationship of transportation and land use is evident in the Comprehensive Plan for this Suburban Center, particularly in the following planning objectives for the Suburban Center:

- (a) *Encourage revitalization and redevelopment of portions of the Merrifield Suburban Center to create more attractive and functionally efficient commercial and residential areas with pedestrian-friendly and transit-oriented environments.*
- (b) *Encourage mixed-use development that includes pedestrian and auto circulation systems that integrate the development both internally and externally, resulting in transit-oriented and pedestrian-friendly environments.*
- (c) *Encourage the development of additional housing (including affordable dwelling units) in the Merrifield Suburban Center so that employees may live near their workplace and transit services, in order to reduce the number and length of commuter auto trips.*
- (d) *Develop a cohesive roadway system that provides a more extensive grid of streets to serve the town center, Transit Station Area, and the area between.*
- (e) *Develop a cohesive pedestrian circulation system linked to open spaces such as plazas, courtyards, greenways, and parkland in order to facilitate walking and reduce reliance on private automobiles.*
- (f) *Develop mass transit options, transportation strategies and planned highway improvements to mitigate traffic impacts in the Merrifield Suburban Center and in adjacent residential neighborhoods.*

d. Transit Station Areas

The county contains six Metro transit stations with four more slated for Tysons Corner and additional stations stretching through Dulles Airport along the Orange Line. These Metro stations are evolving into the transportation hubs for the county. Redevelopment can be seen at each Metro station. At both the Vienna and Dunn Loring-Merrifield Metro stations, WMATA is in the process of selling land adjacent to the stations to be transformed into transit oriented developments. These transit oriented projects provide the density for future growth with a smaller per-person traffic demand than single family housing that is typical in the county.

Some of the important lessons from the Fairlee development proposed adjacent to the Vienna Metro include:

- Metro Capacity—the Metro system needs to expand to support new riders at these denser developments. Consideration is needed for both additional Metro cars and bottlenecks in the system, such as the Rosslyn tunnel.
- Replacement of Metro Parking—as redevelopment occurs at the transit stations, existing commuters need to be accommodated.
- School Capacity—as density increases, public facilities and schools need to be enhanced and expanded to support new residents.
- Transportation – Transportation Demand Management needs to be in place to verify transportation projections are in line with the development reality and mitigation plans need to be approved in advance. The Fairlee project highlighted the need for better TDM across the county.
- Environmental Issues—include protecting our environment and providing environmental or natural space for residents. Environmental protection includes stormwater management as well as preserving air quality, managing waste, recycling, and “green” building to minimize energy consumption. Environmental opportunity means that additional open space needs to be preserved for a denser human population.
- Mix of Uses—the mix of uses should help to create a synergy of uses resulting in an opportunity for both current and new residents to walk to shopping and other services in their neighborhood.
- Protection of Stable Neighborhoods— any increased density should be focused and constrained in a core area of the Metro station platform. The purpose of focusing density is twofold: first, TOD studies show that the highest percentage of transit ridership is generated by development within ¼ mile of the platform and that transit ridership drops off past the quarter mile. Secondly, the protection of stable neighborhoods requires that higher density be constrained and that density does not creep beyond clear, logical boundaries.

These lessons were specifically identified in the Fairlee Comprehensive Plan motion with specific language written into the Plan amendment to address them. As other transit stations are developed, similar consideration will be required.

e. Summary

With the advent of build-out and the continued growth within the County, new development will be much more complicated than the initial development within the county. There will be changes imposed on existing citizens and businesses and impacts that are both real and perceived. Integrated land use and transportation planning is essential to maintain our quality of life into the future.

From an environmental perspective, the initial development of the county created a baseline that currently exists. As redevelopment occurs, be it at higher density or simply expanding existing development, the county goal should be to maintain or improve the existing baseline. There is no need for any further environmental degradation.

By continuing to integrate land use and transportation planning, the County can change and grow without sacrificing our quality of life.

E. RECOMMENDATIONS

1. Land Use and Transportation Vision and Assessment

The current Fairfax County Comprehensive Plan traces its roots back to the PLUS program that culminated in 1975 and the “Goals for Fairfax County” adopted in 1988. Numerous reviews and regular updates have occurred over the past 30 years, yet as stated in the current Plan: “Many of the key components of the 1975 Plan remain in the revised Plan, such as the emphasis on focusing growth in “Centers”; decreasing automobile dependency; and protecting environmentally sensitive areas and stable neighborhoods. What has changed are some of the means to achieve these ends.”

As the county approaches build out, EQAC recommends that the county:

- a. Evaluate the State of the Plan and publish an updated version of the State of The Plan, An Evaluation of Comprehensive Plan Activities between 1990-1995 with an Assessment of Impacts through 2010 (published in 1996) to cover plan activities between 1995-2005 and assess impacts through 2025. The current process of reviewing each section does not provide a comprehensive review of the interrelationships between sections, especially Land Use and Transportation, and does not review the underlying principles of the Plan.
- b. Assess the state of the county with respect to the PLUS Principles set forth in 1975 and the reality 30 years later. The PLUS Principles and planning approach were designed to achieve the following:

- To increase local employment (in a period when Fairfax County was still primarily a bedroom suburb on the fringe of the urban core);
- To decrease reliance on the private automobile by reducing the length of work trips and making mass transit facilities more easily accessible;
- To reduce pressure for development in environmentally sensitive areas;
- To preserve stable neighborhoods; and
- To lower costs by more efficient provision of public services.

The Comprehensive Plan provides guidance to balance these competing goals. This assessment will help clarify the historical lessons learned and identify areas that have proven successful at a macro level across the county and where it needs to be strengthened for a future vision.

2. Land Use Tracking Capability

Over the past three years, EQAC has recommended that the county upgrade or replace the Urban Development Information System (UDIS). Working with staff to better understand the situation, we are expanding the scope of this recommendation, and now urge the county to develop a capability to track the full lifecycle of each land parcel in the county. This capability should be leveraged by all county business functions. It will require the integration of multiple disparate databases that contain parcel information across county departments.

The ability to capture and share parcel information will improve the county's ability to:

- Evaluate planning issues and development options, account for Comprehensive Plan changes, and capture real time plan changes
- Facilitate public safety and plan for emergency preparedness
- Forecast future growth
- Understand and analyze land use at a finer resolution and provide information on mixed use
- Evaluate the environmental effect of each parcel and provide data necessary for modeling and understanding the cumulative effect of development

The integration of data across functional areas should take advantage of current technologies including GIS that allow information from disparate databases to be combined and analyzed by users from many different business functions. Consideration also should be given to making parcel "life-cycle" information available to citizens and businesses in electronic formats that would allow them to understand and use this information.

3. Land Use and Transportation Planning

- a. EQAC recommends that the Board of Supervisors and the county's Department of Planning and Zoning continue to consider land use and transportation together when revising the Comprehensive Plan.

- b. EQAC recommends that the county identify and collect data on a parcel level that allows analysis of the parcel effect on environmental quality. Potential information includes impervious surface area, tree coverage, and existing and planned use and development intensity.
- c. EQAC recommends that the county develop models that allow analysis of the macro effects of land use and transportation decisions. These models should highlight congestion, air quality, commuting patterns, and health effects for use in future decisions. Such information is necessary as the county becomes more complex and densely developed. The county should also require Transportation Demand Management studies and plans for significant new development projects.
- d. EQAC recommends that the county adopt new standards and ordinances to support Low Impact Development (LID) as part of the Public Facilities Manual. The county should also adopt ordinances, incentives, and proffers that encourage Green Building.

4. Teleworking

- a. EQAC commends the Board of Supervisors for actively supporting teleworking among the county staff. We are encouraged that the county is steadily increasing participation toward twenty percent. We urge that the Board continue to aggressively support the program.
- b. EQAC commends the Board of Supervisors for maintaining its leadership role in improving the environment through greater use of teleworking by establishing an aggressive program directed at encouraging employers in the county to adopt or expand telework opportunities.
- c. EQAC recommends that the Board of Supervisors work with the Federal government to encourage an increase in teleworking. Further, we recommend the Board of Supervisors work closely with the Virginia Congressional Delegation to secure resources to establish teleworking sites within the county.

5. Transportation

- a. EQAC commends the Board of Supervisors for improving the funding for the Non-Motorized Transportation (Trails) Committee. EQAC recommends that the Board continue to provide regular funding to this Committee to implement those projects that have the greatest potential for increasing non-motorized methods of transportation within the county and reducing hazards to pedestrian traffic.

- b. EQAC recommends that the county focus on improving transit utilization through a systematic plan that focus on multiple options within a community. For example, the Virginia Railway Express (VRE) Burke EZ Bus provides a convenient alternative to commuting to the Burke VRE station. This can be combined with pedestrian improvements, more connector bus options, and biking trails that together provide a diverse transportation plan.

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An excellent bibliography of additional resource materials on the land use and transportation can be found at www.washingtonregion.net/html/furtherreading.html

ANNUAL REPORT ON THE ENVIRONMENT

CHAPTER II

AIR

QUALITY

II. AIR QUALITY

A. ISSUES AND OVERVIEW

1. Introduction

Over the last several years, Fairfax County has demonstrated its commitment to being an active partner in improving the region's air quality. In the past, the Environmental Quality Advisory Council (EQAC) recommended that county staff become more involved in regional planning efforts, and that recommendation has been followed. In February, 2003, the County Executive issued a "Declaration on Air Quality Leadership." Then, in the spring of 2003, the Environmental Coordinating Committee (ECC) chartered an Air Quality Subcommittee (AQS) composed of cross-agency staff members and tasked it with developing an air quality management plan for the county in cooperation with EQAC. County staff proceeded with this effort, and in February, 2004, the AQS held a public meeting to present and discuss its conceptual recommendations. Using the county residents' input, the committee developed the 2004 Air Quality Protection Strategy Recommendations Report along with a Clean Air Café Menu (see <http://www.fairfaxcounty.gov/opa/airquality/protectionstrategy.pdf> and <http://www.fairfaxcounty.gov/opa/airquality/cleanairmenu.pdf>, respectively). These April 19, 2004 documents were presented to ECC, EQAC and the Environmental Committee of the Board of Supervisors (BOS). While EQAC understands that not all of the recommendations can be implemented immediately, we encourage the BOS to implement all of the recommendations in the report. EQAC congratulates county staff for being awarded a 2005 National Association of Counties Achievement Award for the development of the air quality plan, Improving Air Quality in the Washington Metropolitan Region – A Commitment to Air Quality Excellence – 2004 Protection Strategy and the Clean Air Café Menu. We are happy to see the county receive recognition for its hard work and efforts to promote and encourage clean air initiatives and practices. Below is a list of some of the recommendations that have already been implemented. Several of the recommendations were included as part of the State of Virginia's Air Quality Severe Area State Implementation Plan (SIP), submitted March 1, 2004, to meet the Clean Air Act requirements. These efforts clearly demonstrate the Board's leadership and commitment to the idea of clean air excellence. Unless otherwise noted, the information shown below was current as of May, 2005.

- Diesel retrofits: To date, the Board of Supervisors has approved reprogramming of the electronic controls on certain school bus engines and installation of diesel oxidation catalysts on school buses and other diesel powered county equipment. A contract for the school buses was awarded in April, 2004, and the last bus was completed in February, 2005. In all, 1,012 buses were retrofitted, which is projected to reduce NO_x emissions by 175 tons and hydrocarbon emissions by 30 tons over the remaining life of the buses. Another contract was awarded in June, 2005 to install diesel oxidation catalysts on over 100 heavy duty trucks during the

next six months. Funding for these efforts came from \$2 million the Board of Supervisors approved at the FY 2003 Carryover Budget for emission reduction programs, along with grant funds totaling \$1.095 million. In addition, funds in the amount of \$1.5 million have been made available for the retrofit of the Connector buses with the catalyzed diesel particulate filters.

- **Telework on Code Red Days:** The Board of Supervisors and the County Executive continue to champion this effort on the part of County employees. Approved teleworkers are encouraged to telework on Code Red Days even if they were not scheduled to telework on that day. Currently (May, 2005), more than 750 county employees telework two to four days per month. An expansion effort has been underway to raise that number to 1,000 by the end of 2005. Telework expansion reflects the Fairfax County Board of Supervisors' adoption of the regional goal set by the Metropolitan Washington Council of Government – to reach a level of 20 percent of the eligible workforce teleworking one day per week or more by 2005. In order to keep the pressure on to sign-up additional county teleworkers, the county sponsors telework events, recognizes county departments that increase the number of teleworkers, and uses communication tools such as the Employee Courier to feature articles about teleworking and teleworkers.
- **Wind Energy purchase:** Fairfax County agreed to purchase 5% of its electricity from Mountaineer Wind Farm in West Virginia in April, 2005. Staff worked with the Virginia Energy Purchasing Governmental Association (VEPGA) to change the by-laws to allow this purchase. It is the first wind energy initiative in Virginia. It's a two-year contract and it's a joint purchase with Arlington County. Fairfax County's cost is \$82,000 per year along with the shared \$15,000 cost for negotiation expenses. The projected emission reductions are 6.3 million pounds of CO₂, 23,200 pounds of SO₂, and 11,600 pounds of NO_x.
- **Participation as a Clean Air Partner:** Fairfax County government has been a member of Clean Air Partners, a regional public-private partnership chartered by the Metropolitan Washington Council of Governments (MWCOC) and formerly known as ENDZONE, since 1998. Its mission is to build awareness of how individuals contribute to air pollution and to promote easy and effective voluntary actions that individuals and employers can take to reduce air pollution and improve the health and quality of life in the region. In the spring of 2005, the Office of Public Affairs and the Health Department joined with Clean Air Partners in the "2005 Air Quality Action Days" media campaign. As a Clean Air Partners sponsor, during the summer months, Fairfax County will be included with other Clean Air Partners in a comprehensive public outreach campaign through radio and television spots, print ads, fliers, promotional materials, and Web site links. This effort is to build awareness of how people contribute to air pollution and to promote easy and effective voluntary actions that can be taken to reduce air pollution and improve the health and quality of life in the region.

- Air Quality outreach: The county has been proactive in its efforts to inform county employees and residents about air quality programs and ways to reduce air pollution. The Office of Public Affairs and the Health Department have been working together to create public education materials about the dangers of ground-level ozone and particle pollution, and actions that county employees and county residents can take to promote cleaner and healthier air in this region. Materials they've developed for adults and children are being distributed in government offices, libraries, recreation centers, community meetings, and at events such as *Celebrate Fairfax*. In addition, articles on air quality have been distributed through internal county publications and external outreach, including e-mail, Web sites, cable Channel 16, and homeowners associations. The county also has a notification program that involves the posting of Air Quality Action Day forecasts on Fairfax County Government Cable Television Channel 16 and the county Web site, as well as sending e-mail notifications to all county employees. These messages include appropriate actions to take to reduce contributions to ozone formation. Some actions currently practiced by Fairfax County government when an Air Quality Action Day for ozone is forecast include: the refueling of vehicles after sunset; the restriction on the use of non-essential motorized operating equipment; encouraging employees to telework and teleconference to participate in meetings; and the offering of free trips on the Fairfax Connector.
- Use of low Volatile Organic Compound (VOC) paints: Besides reducing emissions of ozone-forming compounds, low-VOC paints improve indoor air quality by reducing eye or respiratory irritation caused by exposure to paint fumes.
- Episodic ban on the use of gasoline powered lawn and garden equipment: County and contractor mowing and trimming operations will be deferred on Air Quality Action days for ozone (Code Red Days), except on specialized turf areas at the golf courses and athletic field complexes. The county will continue a replacement policy to purchase low-emissions lawn and garden equipment that reduces ozone precursor emissions.
- Episodic ban on the use of VOC-containing paints and pesticides: Deferring the use of VOC-containing paints and coatings on Air Quality Action days for ozone (Code Red Days) will reduce VOC emissions (an ozone precursor) and overall ground-level ozone formation on Code Red Days. Both the active and inert ingredients of many pesticides are reactive in the formation of ozone. Under this policy, county and contractor applications of pesticides would be deferred on Air Quality Action Days for ozone.
- Episodic ban on the refueling of non-essential gasoline powered cars and equipment: County employees have been notified to not refuel their gasoline powered vehicles and equipment on Air Quality Action Days for ozone until after dusk, unless refueling is needed for vital functions. In order to monitor the

effectiveness of this measure, a report of any refueling that occurs on a Code Red Day will be given to agency directors the next day enabling follow-up action without restricting vital functions that require refueling.

- **Best Practices in Pesticide Application:** The Fairfax County Park Authority has implemented an integrated pest management (IPM) program at golf facilities and athletic field complexes. The Park Authority's approach to select pesticide applications is one of prevention rather than a curative one. This approach greatly reduces the amount of product (VOC emissions) required to keep turf healthy and allows the IPM program to be more effective.
- **Alternative Fueled Vehicle Purchases:** The county favors purchase of hybrid-drive vehicles when appropriate for replacement of vehicles being retired. The current county fleet has 84 hybrid-electric vehicles (55 Toyota Prius and 29 Ford Escape SUVs).

EQAC is encouraged by this and feels that the county is moving in the right direction.

a. Clean Air Interstate Rule

On March 10, 2005 EPA issued the Clean Air Interstate Rule (CAIR), which is expected to achieve the largest reduction in air pollution in more than a decade. CAIR will be effective starting July 11, 2005, and it requires 28 eastern states including the Metropolitan Washington region to permanently cap emissions of sulfur dioxide (SO₂) and nitrogen oxides (NO_x). This rule was put into place to address the fact that EPA has determined that upwind states are contributing significantly to nonattainment of 8-hour ozone and PM_{2.5} (particulate matter less than 2.5 microns in diameter) in downwind states. Implementation of the rule should assist nonattainment areas in achieving the National Ambient Air Quality Standards (NAAQS). States covered by CAIR must submit a SIP by September 11, 2006 including control measures to reduce emissions of NO_x and SO₂. EPA is requiring that emissions reductions be implemented in two phases. The first phase of NO_x reductions start in 2009 (covering 2009 – 2014), and the first phase of SO₂ reductions start in 2010 (covering 2010 – 2014). The second phase of reductions for both NO_x and SO₂ starts in 2015. The required emissions reductions requirements are based on controls that are known to be highly effective. When fully implemented, this rule is expected to reduce SO₂ emissions by over 70 percent and NO_x emissions by over 60 percent from 2003 levels. So the hope should be, as we have stated in the past, that we would see something in the neighborhood of a 20% reduction in NO_x for Fairfax County as a result. These reductions are an important part of the Washington region's SIP, a plan to reduce air pollution in our region. Actual reductions in the metropolitan area along with reductions of transported NO_x will be critical to attaining the federal standard during ozone season. This EPA action provides for the NO_x SIP Call cap and trade program to be replaced by the CAIR ozone-season NO_x trading program.

This rule also includes revisions to the Acid Rain Program regulations streamlining the operation of the Acid Rain SO₂ cap and trade program. The effective date for the Acid Rain Program changes is July 1, 2006.

A primary concern that we have with this rule is that it allows trading of emission credits and, as a result, emission reductions on a point source basis cannot necessarily be predicted. There are four major power plants in the Washington area and it is our understanding that in some, if not all, of these cases those power plants are emitting considerable quantities of NO_x in this area as a result of decisions to purchase emission reduction allowances outside of the Washington Metropolitan air shed.¹ A particular concern for the Washington area is the Potomac River Generating Plant in Alexandria. Because the plant produced NO_x emissions in 2004 well in excess of its state operating permit, the Virginia Department of Environmental Quality (DEQ) is pursuing enforcement actions against the plant.

Although it should not theoretically have any direct impact on the overall effect of the CAIR, the implications of New Source Review (NSR) reform are also of concern to us since those reforms may result in additional generation of NO_x at some coal burning facilities in the future.

b. Planning for the New Eight-Hour Ozone and Particulate Matter Standards

EPA published final non-attainment designations for the eight-hour ozone standard in April, 2004. The Metropolitan Washington area, which includes Fairfax County, was designated a moderate non-attainment area. EPA plans to revoke the one-hour ozone standard on June 15, 2005. Once the one-hour standard is revoked, the 8-hour standard will be in force. The Metropolitan Washington region must develop a new SIP and submit it to EPA by June, 2007 showing how it will attain the eight-hour ozone standard by 2010. The Metropolitan Washington Air Quality Committee (MWAQC), the air quality planning group for the Washington region, along with its Technical Advisory Committee (TAC), has started to plan for development of the eight-hour SIP and identification of additional emission control measures. Most recently, on May 31, 2005, Virginia Governor Mark Warner, Maryland Governor Robert Ehrlich, Jr., and D.C. Mayor Anthony Williams signed a Memorandum of Understanding creating the **Interstate Air Quality Council** (IAQC). The Council consists of six members: the secretaries of the environment and transportation from each of the three governments. The IAQC will provide overall guidance and streamline planning to ensure the states and the District meet their shared goals of improved air quality, including compliance with new federal standards for ozone and fine particulates, and efficient transportation. The IAQC will work in concert with the air quality and transportation committees of the Metropolitan Washington Council of Governments (MWCOG) to achieve its goals. All of this serves to make the point that the advent of the new eight-hour standard

¹ Three of these plants are in Maryland (Morgantown, Chalk Point, and Dickerson) and one is in Virginia (the Potomac River Generating Plant in Alexandria).

continues to leave little doubt that this new standard will inevitably make air quality management activities in the county considerably more difficult.

In December, 2004, EPA designated the Metropolitan Washington region as a non-attainment area for fine particle pollution, also known as PM_{2.5}. The designation became effective on April 5, 2005. Nonattainment areas are required by early 2008 to submit to EPA a SIP to define the expected methods for reducing the fine particulate matter level in the air and emissions of PM_{2.5} precursors. MWAQC and TAC will start planning efforts to meet this standard soon. They are still awaiting guidance documents at this time.

The county in 2004 once again had exceedances of both the one-hour and the eight-hour standard.² However, the 2004 ozone season shows a slight improvement over the 2003 season, with fewer exceedances of the one-hour standard and an equal number of eight-hour exceedances. As the county moves away from the one-hour standard and toward the eight-hour standard, the direct implications of chronic nonattainment, especially of the eight-hour standard, will become a much more serious matter in the region. Fairfax County must continue to work with the MWAQC to develop control measures that can be implemented in the region to attain compliance with the ozone standard.

c. Severe Area SIP Planning

On May 13, 2005, the Environmental Protection Agency (EPA) approved Virginia's one-hour "Severe Area SIP." In February, 2004, MWAQC approved the new "Severe Area" SIP for submittal (by March 1, 2004) to EPA by Maryland, Virginia, and the District. Upon its redesignation as a "severe" non-attainment area in February, 2003, the Washington region was required to prepare a new SIP to show compliance with the more stringent severe area requirements. An interim SIP submittal in August, 2003 fulfilled some of these requirements. The rest of the requirements were fulfilled by the March, 2004 submittal. The new SIP includes an updated attainment demonstration reflecting revised MOBILE6-based motor vehicle emissions budgets, the demonstration of 3% per year rate of progress (ROP) from 1999-2002 as well as from 2002-2005, the adoption of contingency measures for failure to make ROP during those periods, and the submission of Reasonably Available Control Measures (RACMs). There are other requirements as well.

In developing this SIP, the MWAQC identified a series of control measures that it believes will allow us not only to demonstrate progress toward, but in fact to attain, the ozone National Ambient Air Quality Standards (NAAQS) by November 15, 2005.³ These include new regulations requiring redesigned fuel containers, low-VOC paints and consumer products, and changes to certain business practices that

² Fairfax County and other local jurisdiction have been monitoring for the eight-hour standard for several years even though compliance was not yet required.

³ The details of this SIP, such as they are, can be reviewed on the COG Web site at www.mwcog.org/environment/air.

result in high VOC emissions. Many of these regulations are in place and some areas of the metropolitan region will be implementing some or all of them in 2005.

An additional portion of the region's emission control strategy is a "voluntary bundle" of emission reductions from innovative programs implemented by local governments. These programs include a gas can exchange, use of low-VOC paints, purchase of wind power, retrofitting of diesel school buses, and purchases of alternative fueled vehicles. Fairfax County was a leader in committing to implement many of these critical programs.

d. Conformity Planning Requirements and Status

The purpose of conformity is to assure that planning for transportation activities is consistent with air quality management goals. In non-attainment areas such as the Metropolitan Washington Area, transportation planning cannot be allowed to proceed if: (1) it contributes to the creation of new air quality violations; (2) it contributes to the worsening of existing air quality violations; or (3) it delays the attainment of ambient air quality standards.

The August, 2003 SIP submittal contained revised motor vehicle emission budgets, which were approved by EPA as of December 31, 2003. These budgets were slightly revised in the March, 2004 submittal.

EPA is in the process of developing final guidelines for conformity under the eight-hour ozone standard. These guidelines, which were issued in July, 2004, will help the Washington region develop a plan for demonstrating conformity for the eight-hour ozone standard once the one-hour standard is revoked in June, 2005.

In December, 2004, EPA designated the Metropolitan Washington region as nonattainment for PM_{2.5}. The designation became effective on April 5, 2005 and it affects transportation conformity planning requirements immediately: areas have a one-year grace period that starts on April 5, 2005 in which to demonstrate conformity of transportation plans and programs to the new standards. If a plan and Transportation Improvement Plan (TIP) that conform to the new standards are not in place by April 6, 2006, the conformity status lapses. This issue is being worked on by the Transportation Planning Board (TPB) of MWCOG.

2. Air Quality Status in Northern Virginia

a. Ground-level Ozone

The Metropolitan Washington area, including Fairfax County, was classified as a severe non-attainment area for the one-hour ozone standard and a moderate non-attainment area for the eight-hour ozone standard during 2004. To obtain compliance with the eight-hour standard, the three year average of the fourth-

highest daily maximum eight-hour average value at each monitoring site in a region must not exceed 0.08 ppm.

b. Ozone Exceedances in 2004

Attainment of the ozone standard in the Metropolitan Washington area will require three years with no more than three ozone exceedances at any one monitor in the region. An exceedance day (for the one-hour standard) occurs when an ozone-monitoring site exceeds the NAAQS of 0.125 ppm for at least one hour. In 2004, there were two ozone exceedant days for the one-hour standard in the Washington region and in Fairfax County (Table II-1). On the two days of exceedances in Fairfax County, two sites registered an exceedance on one day while a different site exceeded on the second day. A graph of the one-hour ozone exceedances for the Metropolitan Washington region and Fairfax County can be viewed in the Air Quality Trends section (Figure II-1).

Table II-1 Regional One Hour Ozone Exceedances, 2004		
Date	Location	Maximum One-Hour Ozone (ppm)
July 2	Mount Vernon, VA*	0.140
	Franconia, VA*	0.138
	Alexandria, VA	0.135
July 3	Lewinsville, VA*	0.129
	Ashburn, VA	0.126

*Fairfax County Monitoring Station

Source: Metropolitan Washington Council of Governments and Fairfax County Health Department

Monitors in Fairfax County recorded violations of the eight-hour ozone standard on seven days during the 2004 ozone season. Violations occurred at five different county monitoring sites. The Washington region also registered seven violations of the eight-hour standard during the 2004 season (Table II-2).

Obviously, no matter what we conclude regarding compliance with the one-hour standard (and the only conclusion is that we remain out of compliance), the situation for the eight-hour standard, which will be the only ozone standard by June 2005, is very challenging. The region will have to implement additional control measures to obtain compliance and work with EPA and regional planning groups to find ways to reduce ozone transport into this region. It will not be easy to implement additional control measures for this region, but they will be necessary to meet the ozone standards.

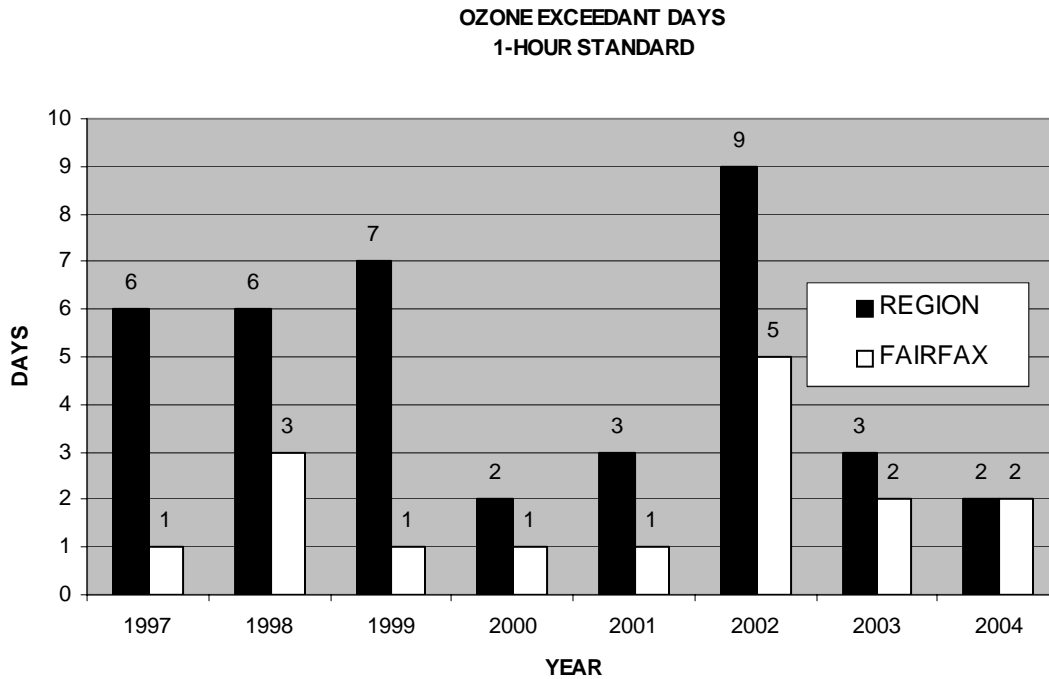
**Table II-2
Regional Eight-Hour Ozone Exceedances, 2004**

Date	Number of Stations that Exceeded the Standard	Maximum Value in the Metropolitan Statistical Area; Maximum 8-Hour Ozone (ppm)
May 11	6	0.097
June 9	3	0.088
July 2	12	0.123
July 3	14	0.107
July 21	9	0.99
August 4	1	0.087
August 24	2	0.089

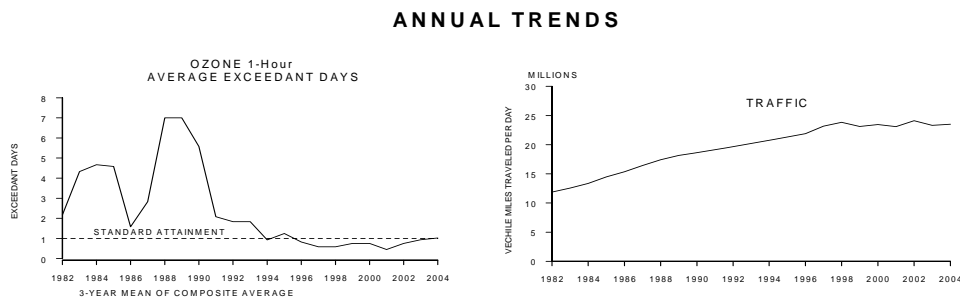
Source: Metropolitan Washington Council of Governments

c. Air Quality Trends

The Metropolitan Washington Council of Governments (MWCOG) analyzes monitored air quality data in the metropolitan region; its December 15, 2004 News Release states that the air quality in this region is improving. MWCOG reports that ozone levels have decreased over the past decade, even on hot, dry summer days when ozone most often forms. In addition, air quality monitors throughout the region have measured lower concentrations of ozone and more monitors are in compliance with the standard. Ten years ago, the region experienced an average of twelve days with unhealthy ozone levels, compared to an average of five days in the most recent year. This trend is also reflected in county data (Figure II-2). The region has made great strides reducing the emissions that cause ozone. Nitrogen oxides, which are found in vehicle exhaust and power plant emissions, have decreased by an estimate of 30 percent between 1990 and 2002. In the same time period, volatile organic compounds emitted from chemical solvents, paints, and gas cans were reduced by 60 percent. While local emission reductions have reduced ozone levels, the region's air quality continues to be significantly affected by ozone emissions transported into the region from other areas. The new Clean Air Interstate Rule should help reduce ozone transport. In 2004, the county reported two exceedant days of the one-hour standard, with one day reporting an exceedance at two sites and the second day reporting an exceedance at one site. Data for the entire Washington region also show two exceedant days, with three sites violating the one-hour standard on one day and two on the other day. The eight-hour ozone standard is going to make it more difficult for the region to meet the federal standard (Figure II-3). This indicates that the county cannot afford to reduce or diminish its recent air quality planning efforts.

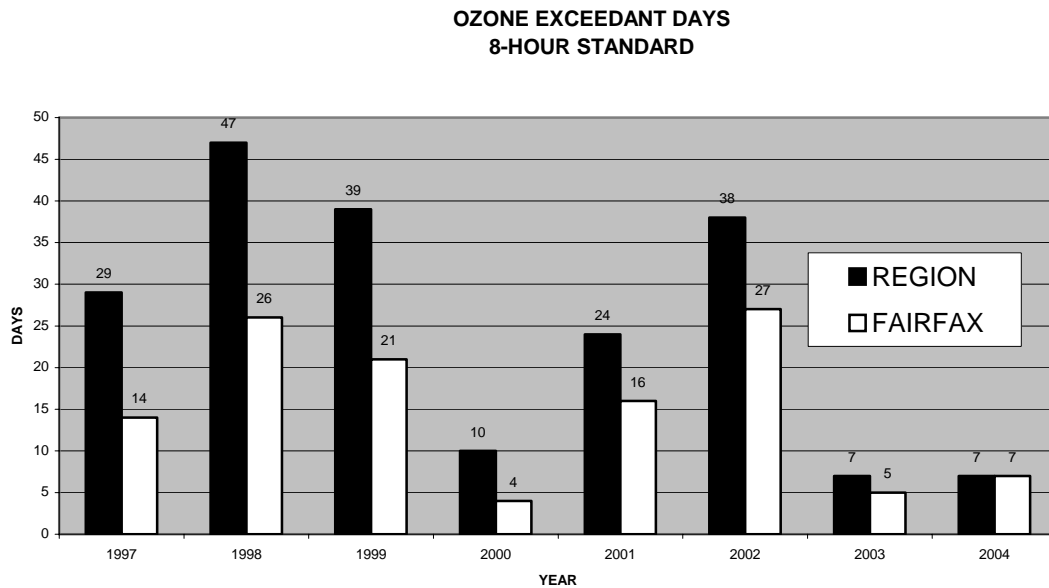
Figure II-1: Air Quality Trends in Relation to a One-Hour Ozone Standard

Source: Fairfax County Health Department

Figure II-2: Air Quality Trends in Relation to a One-Hour Ozone Standard (continued)

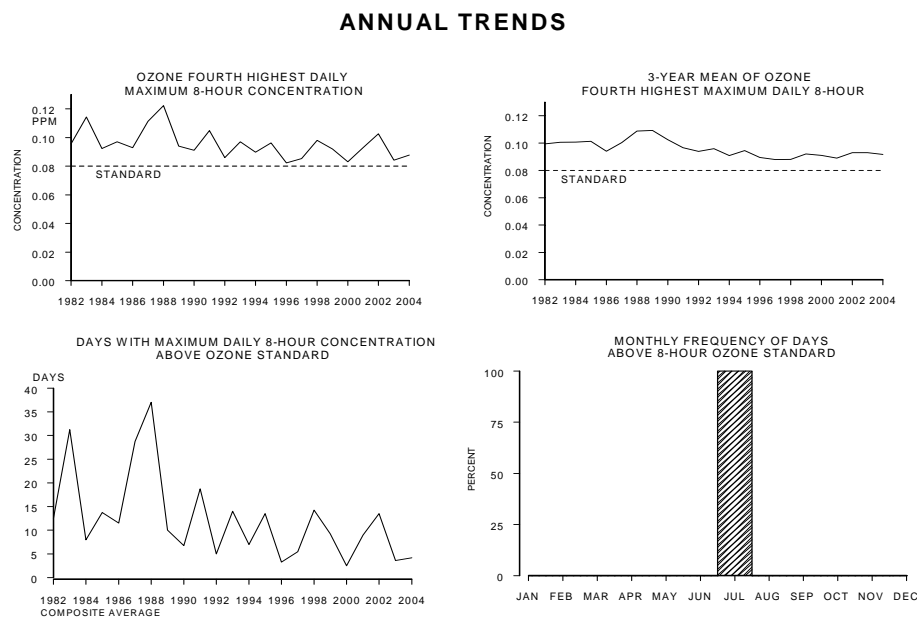
Source: Fairfax County Health Department (Fairfax County Monitoring Sites)

Figure II-3: Air Quality Trends in Relation to an Eight-Hour Ozone Standard



Source: Fairfax County Health Department

Figure II-4: Air Quality Trends in Relation to an Eight-Hour Ozone Standard (continued)



Source: Fairfax County Health Department (Fairfax County Monitoring Sites)

B. MAJOR PUBLIC AGENCY RESPONSIBILITIES

1. Introduction

Although compliance with National Ambient Air Standards (NAAQS) and resulting air quality management responsibilities is a function of federal law, in Fairfax County we have a bifurcated situation where these responsibilities have been split between the State of Virginia and the regional metropolitan planning organization (MPO). MPOs are set up under the Clean Air Act (CAA) in metropolitan areas with populations in excess of 50,000. In more difficult situations, MPOs are multi-jurisdictional, as is the case in the Washington MPO. Members of MPOs are appointed by the governors and mayors of affected jurisdictions to represent areas included in the MPO. The MPO works with state departments of transportation and transit providers in identifying transportation needs and priorities. They make transportation investment decisions for the metropolitan area and, by default, for the individual regions encompassed within the MPO.

2. Commonwealth of Virginia

a. Virginia State Air Pollution Control Board

This board is authorized to propose policies and procedures for air quality regulatory programs, including emissions standards for landfills and vehicles.

b. Department of Environmental Quality

This department is responsible for establishing standards for air quality monitoring and vehicular inspection and maintenance programs.

c. Virginia Department of Transportation

This department is responsible for planning, developing, delivering, and maintaining transportation for the traveling public.

3. Region – The Metropolitan Washington Council of Governments (MWCOG), the Metropolitan Washington Air Quality Committee (MWAQC), and the National Capital Region Transportation Planning Board (TPB)

The MWCOG is the Metropolitan Washington regional planning group that works toward solutions to regional problems related to air and water quality, transportation, and housing. MWCOG also manages other programs, such as those responsible for forecasting demographic changes. The MWAQC, which is a part of MWCOG, is responsible for all air quality planning in the Metropolitan Statistical Areas identified

under Section 174 of the CAA. The authority of MWAQC is derived from the certifications made by the Governors of Virginia and Maryland and the Mayor of the District of Columbia. MWAQC was established to conduct interstate air quality attainment and maintenance planning for the Metropolitan Washington region. Members are appointed and Fairfax County currently has three members of the Board of Supervisors on the committee. In 2005, Supervisor Dana Kaufman (Lee District) is Chairman of MWAQC. The TPB serves as the designated MPO for the Washington region and is responsible for regional transportation planning and conformity. The TPB is staffed by the Department of Transportation Planning, which is part of MWCOG. Members of the TPB are appointed, and Fairfax County currently has two members of the Board of Supervisors sitting on the TPB. TPB and MWAQC work together on air quality and transportation issues. MWCOG is also responsible for issuing air quality indices on a weekly basis.

a. MWAQC Technical Advisory Committee

This committee was established to advise and assist MWAQC in planning for and maintaining the region's air quality. Members review technical issues and documents before they are submitted to MWAQC for review and approval. The Chairman of the committee for 2005 is Tad Aburn, Maryland Department of the Environment.

b. Interstate Air Quality Council

On May 31, 2005, Virginia Governor Mark Warner, Maryland Governor Robert Ehrlich, Jr., and D.C. Mayor Anthony Williams signed a Memorandum of Understanding creating the Interstate Air Quality Council (IAQC). The Council consists of six members: the secretaries of the environment and transportation from each of the three governments. The IAQC will provide overall guidance and streamline planning to ensure the states and the District meet their shared goals of improved air quality, including compliance with new federal standards for ozone and fine particulates, and efficient transportation. The IAQC will work in concert with the air quality and transportation committees of MWCOG to achieve its goals.

c. Forecasting Subcommittee

This subcommittee considers how to monitor and report the new eight-hour ozone standard and how to devise guidelines for issuing health alerts during the ozone season.

d. Attainment Subcommittee

This subcommittee considers evidence for the case that the Washington non-attainment area can attain the eight-hour ozone standard with the control measures already adopted.

e. Conformity Subcommittee

This subcommittee reviews Air Quality Conformity Determinations prepared by the TPB to ensure that regional transportation plans are consistent with plans to improve air quality. This includes verifying that estimated emissions from mobile sources, such as cars, trucks, and buses, do not exceed the mobile budget, a cap on regional mobile emissions contained in the region's air quality plan.

e. Air Quality Public Advisory Committee

This committee has been set up to provide a vehicle to brief citizens on actions pending before MWAQC. This committee functions as an important source of feedback from the public on air quality concerns in the metropolitan area.

f. Control Measures Workgroup

This workgroup was established to research control measures and develop a plan of emission-reducing control measures for the region to implement in an effort to reach attainment for ozone. With the recent designation of PM_{2.5} nonattainment, this group will probably add emission reducing control measures for attainment of this standard to its duties.

4. County of Fairfax**a. Department of Health, Division of Environmental Health, Air Quality Module**

This division is authorized by the Fairfax County Code, Chapter 103, in cooperation with federal and state agencies, to conduct an air monitoring program. In the past, this division has provided consultative services to those requesting assistance in indoor air quality issues and other air quality-related matters. If there is a substantial threat to public health, on-site investigations are supposed to be provided concerning indoor air quality and exposure to toxic substances in non-occupational, indoor environments. A representative from the Health Department now sits as a member of the MWAQC Technical Advisory Committee and functions as a conduit to communicate with the county on air quality issues of concern to MWAQC. At the present time, the Air Quality Program Manager represents Fairfax County on this committee.

During a time of increasing responsibility to coordinate and manage the increasingly complex body of information relevant to air quality planning in Fairfax County, EQAC is pleased that an Air Quality Program Manager position has been filled to work on planning issues. The Air Quality Section continues its monitoring network in the county, measuring levels of criteria pollutants in an effort to measure compliance with the National Ambient Air Quality Standards. All of the

monitoring data obtained from these sites goes into the National Air Quality Database.

b. Department of Transportation

This agency is responsible for the planning and the coordination of improvements that reduce both congestion and the vehicle miles traveled.

C. PROGRAMS, PROJECTS, AND ANALYSES

1. Regional Air Quality Planning

In response to our recommendation in 2002 that the county establish air quality planning capabilities in the Health Department, the decision was made to fill an Air Quality Program Manager position, which was filled in February, 2005. This staff member will work with the Director of Environmental Health and the Environmental Coordinator to manage air quality efforts on behalf of the county. Those efforts are evolving and EQAC is involved, in a limited way, in reviewing and advising with respect to those activities. EQAC will continue to do everything it can to try to cooperate with the county in its efforts to identify short-term strategies that can result in compliance with the ozone NAAQS.

D. CONCLUSIONS AND OBSERVATIONS

1. In August, 2002, at the request of the Deputy County Executive, EQAC provided a summary of our concerns regarding air quality management needs in Fairfax County that included recommended staffing needs and related job description(s). We concluded our observations at that time by stating that "...planning capability will mean nothing unless the results of that capability can be adequately integrated into county activities." In November, 2002, at about the time that we released our 2002 Annual Report recommending the hiring of a full-time air quality planner, the county embraced a two-track approach to air quality management that culminated in a series of announcements at the February 12, 2003 ECC/EQAC meeting dealing with air quality management. Since that time, EQAC interaction with the county has occurred principally through our interactions with the ECC and for the most part has been focused on long-term issues associated with the management of land-use/transportation issues associated with the Comprehensive Plan. This seems primarily to have been an outgrowth of our concerns about the possible relevance in Fairfax County of the concept of "Smart Growth." Meanwhile, in 2003, the county developed its own approach to air quality planning, and following discussions with MWAQC, developed an Air Quality Subcommittee designed to develop recommendations for the ECC and BOS on local and regional air quality issues. In April, 2004, the AQS presented its recommendations to the BOS Environmental Committee. EQAC is pleased with the

work of the subcommittee that included a variety of air quality management strategies as shown in the interim report and Clean Air Café menu that was presented to the Board's Environmental Committee. Many of those strategies have already been completed and EQAC recommends that the Board adopt and implement all of the recommendations shown in the menu and report.

2. We seem to be at an interesting point with respect to air quality management in Fairfax County. It is laudable that the county is now focused on the issue of air quality management and is working with MWCOG and others involved in regional planning. We are especially pleased that the county has come forward with SIP (VOC and NOx) emission reduction strategies for both short-term ozone action days and long-term ongoing initiatives. These efforts played a significant role in the Washington region's ability to develop and submit a severe area SIP that has been more acceptable to the EPA. The pattern of ongoing violations, however, discloses a problem that requires reductions that must have impacts on the actual attainment of the standard. We understand that regional planning is taking place to develop control strategies to address this problem and we suggest that the county stay involved in this process.
3. Based on the discussions that have occurred between EQAC, the ECC, and the Planning Commission, we understand the problems and concerns and even the limitations associated with the long-range nature of land use planning as it relates to transportation and air quality. We will continue to interact in that venue to try to constructively address the issues that have been discussed there. Meanwhile, we continue to welcome the opportunity to be as interactive as possible with the Air Quality Subcommittee and its activities.

E. RECOMMENDATIONS

1. County staff should continue to participate in the regional planning efforts through the Metropolitan Washington Council of Governments in identifying both quantifiable and qualifiable emission reduction measures and strategies to reduce air pollutants so that the Clean Air Act standards can be attained. We continue to recommend close coordination and communication between EQAC and the county on strategies and activities necessary to comply with the ozone and fine particle standard.
2. EQAC is pleased with the work of the county's Air Quality Subcommittee that included a variety of air quality management strategies as shown in the interim report and Clean Air Café menu that was presented to the Board of Supervisors' Environmental Committee (see the following: <http://www.fairfaxcounty.gov/opa/airquality/protectionstrategy.pdf> and <http://www.fairfaxcounty.gov/opa/airquality/cleanairmenu.pdf>). EQAC recommends that the Board adopt and implement all of the recommendations shown in the menu and report.

3. EQAC is also pleased to see the air quality outreach effort that the county has started. By getting the word out to people we can obtain voluntary actions and efforts to help improve the region's air quality. Now if the county could only find a way to get more residents out of their cars and using mass transit or teleworking, then we would see a major change in the air quality emissions. The Air Quality Subcommittee should continue promoting clean air education programs and initiatives and find ways to expand their audience. We recommend that the Board of Supervisors continue to fund the air quality outreach program.

LIST OF REFERENCES

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2003 Annual Report on the Environment – Regional Comments, (memorandum from the Deputy Regional Director of the Northern Virginia Regional Office to the Department of Planning and Zoning, Fairfax County, referencing information and contacts for the State of Virginia).

Virginia DEQ Web site, www.deq.state.va.us/ozone/

Declaration on Air Quality Leadership, (memorandum from the County Executive to Senior Management Team dated February 12, 2003).

Implementation of Available Ozone Action Best Practices, (memorandum from the County Executive to Senior Management Team dated July 21, 2003, describing the background and objectives for the Air Quality Sub-Committee and attaching its Charter).

State Implementation Plan (SIP, or Severe Area SIP) to Improve Air Quality in Washington, DC – MD – VA Region, (final SIP and appendices available at the MWCOG Web site (www.mwcog.org/environment/air/)).

Air Quality Management/Fairfax County, (memorandum from the Environmental Quality Advisory Council to the Deputy County Executive dated August 28, 2002).

Correspondence dated November 15, 2002, from the Deputy County Executive to EQAC describing the intentions of the county with respect to air quality in response to the August 28, 2002, memorandum from EQAC.

Fairfax County Web site, <http://www.fairfaxcounty.gov/dpwes/environmental/air.htm>.

ANNUAL REPORT ON THE ENVIRONMENT

CHAPTER III

**WATER
RESOURCES**

III. WATER RESOURCES

A. OVERVIEW

Water resources include streams, ponds, lakes, and groundwater. These resources serve as sources of drinking water, recreation, storm water conveyance, and habitat for a myriad of organisms. Water resources are subject to a variety of water quality problems and are significantly impacted by land disturbances and surface runoff within their watersheds. Over the past several years, Fairfax County has demonstrated a strong commitment to restore and protect its water resources through a variety of management and public outreach initiatives. Unless water resources are managed properly, the rapidly increasing demands put on watersheds, such as rapid development, can create many problems.

1. Watersheds

A watershed is all the surrounding land area that drains into a particular stream, river system, or larger body of water. Watersheds include both surface waters and groundwater. Everyone in Fairfax County lives in a watershed. Larger watersheds usually have sub-watersheds. There are 30 separate watersheds within the county (Figure III-1). For example, the largest watershed in Fairfax County, Difficult Run (58 square miles) has ten streams that drain into the main stream, Difficult Run. It, in turn, drains into the Potomac River. The Potomac River watershed is a sub-watershed of the even larger watershed, the Chesapeake Bay watershed, which is 64,000 square miles and extends from New York through Pennsylvania, Delaware, West Virginia, Maryland, Virginia, and the District of Columbia. All Fairfax County streams are in the Potomac River watershed and subsequently the Chesapeake Bay watershed.

2. Streams

A stream is a system of fresh water moving over the earth's surface. Fairfax County is criss-crossed by a number of streams, often called runs or creeks. These streams are considered flowing water habitats. Rainfall soaks into the earth and drains to low points within the surrounding land, then emerges from the ground as seeps, springs, and trickling headwaters. These tiny threads of running water join with others in the same drainage area to create a stream system. There is a natural progression in size from the smallest tributaries to the largest rivers into which they eventually flow. Perennial streams flow throughout the year and intermittent streams flow only part of the year. There are approximately 973 miles of perennial streams in Fairfax County. One-third of the land in the Fairfax County Park system, approximately 7,000 acres, is comprised of stream valleys. These stream valleys are significant corridors for the county trails system and wildlife.

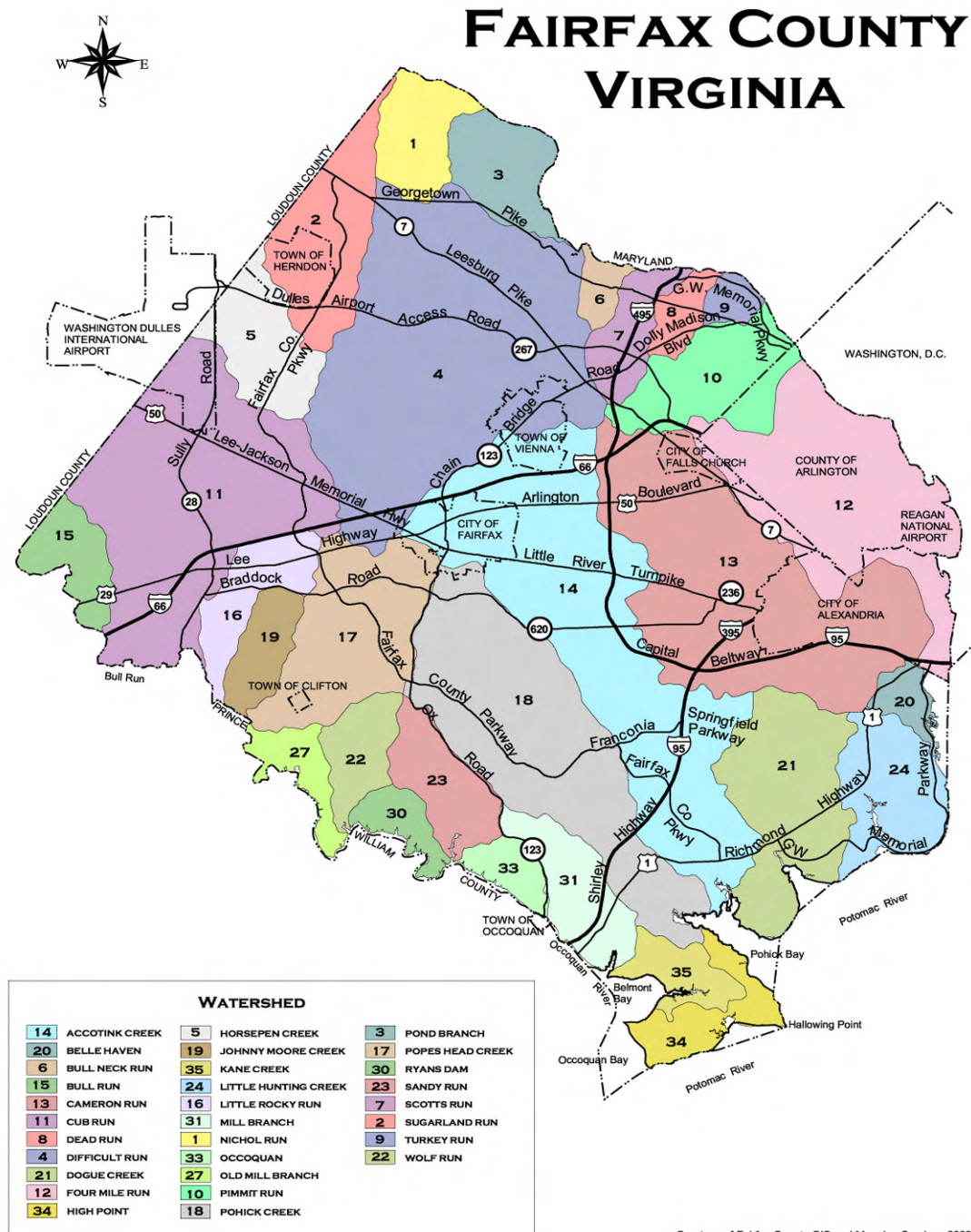


Figure III-1: Fairfax County Watershed Map

3. Stream Ecosystems and Communities

The bottom substrate of a stream can consist of boulders, cobbles, gravel, sand, and/or silt. The type and amount of substrate in a stream makes up the in-stream habitat. Within a stream are shallow, fast flowing areas called riffles. Dissolved oxygen levels are high because water is flowing over rocks, mixing air into the tumbling water. Alternating with riffles are deeper pools and runs where water speed slows and small particles of mineral and organic matter fall to the bottom and oxygen levels are reduced. Each of these stream regions has a diverse community of plants and animals that spend all or part of their life cycles in the water.

The aquatic food chain begins with leaves and other decaying plant and animal material called detritus. These materials are carried into the stream from the surrounding forests and fields by wind and water runoff. Aquatic vegetation such as algae is also an important food source. Benthic (bottom-dwelling) macro (large) invertebrates (without a back-bone) eat this organic matter. Benthic macroinvertebrates include aquatic insect larvae such as stoneflies, mayflies, caddisflies, and true flies as well as snails, clams, aquatic worms, and crustaceans such as crayfish. Fish, birds, and other streamside wildlife, such as frogs, salamanders, and small mammals, eat these macroinvertebrates.

4. Riparian Buffers and Wetlands

A buffer of trees and other types of vegetation lining the banks of streams, also called a riparian area, is another essential part of a healthy stream system. The temperature in a stream greatly affects how much oxygen it can hold. Since cooler water holds more oxygen, trees are vital along the bank or edge of stream or river. Shade from the tree canopy maintains cool water temperatures so the water will hold more oxygen.

Tree cover also provides food and woody debris for shelter when leaves and branches fall into a stream. Streamside forests offer food, nesting sites, and protection to a great diversity of wildlife, including birds, turtles, beaver, and snakes. Tree roots help stabilize stream banks and provide cover for fish, crayfish, and aquatic insects. Riparian buffers help slow down and filter runoff. Excess nutrients carried in runoff are absorbed by vegetation.

Wetland areas adjacent to streams can be forested or open wetlands. These wetlands serve as transitions to stream channels and help to attenuate the effect of stormwater and remove pollutants before they reach the stream. Wetlands provide important habitat for many organisms.

5. Oxygen

Oxygen is vital to organisms that live in a stream just as it is to terrestrial animals. Stream-dwelling animals use oxygen dissolved in the water. Aquatic insect larvae absorb oxygen through their body walls or by the use of gills, such as mayfly larvae. Fish absorb oxygen by drawing water in through the mouth where it passes over

internal gills. High levels of dissolved oxygen are essential to the life functions of a healthy stream community.

6. Nutrients

Nitrogen and phosphorus are nutrients essential to the growth and development of all plants. An overabundance of either, however, can damage stream ecosystems dramatically. Forested buffers can retain and use as much as 89% of the nitrogen and 80% of the phosphorus runoff associated with land use practices. In excess, these nutrients become major pollutants, causing the rapid growth of algae in streams, rivers, lakes, and estuaries. When the algae die and begin to decay, the bacteria breaking down the algae use up the dissolved oxygen necessary for other aquatic life.

7. Groundwater and the Water Cycle

Almost 98% of the water on earth is in liquid form and is found in oceans, lakes, ponds, rivers, and streams. The remaining 2% is found frozen in polar ice caps and glaciers, as moisture in soil, as vapor in the atmosphere, and in the bodies of living organisms.

Water evaporates from surface waters, and, in much smaller amounts, from moist soil surfaces, leaves of plants, and bodies of other organisms. This water, now water vapor, is carried up in the atmosphere by air currents. Eventually these water molecules fall to the Earth's surface as some form of precipitation (rain or snow). This water flows back into streams, then rivers, and eventually the ocean and the cycle starts over.

Some of the water that falls on the land percolates down through the soil until it reaches a zone of saturation. In the zone of saturation, all pores and cracks in the rocks and soils are filled with water (groundwater). The upper surface of the zone of saturation is called the water table. Groundwater provides base flow for streams and is the reason that streams and rivers have flow when it is not raining. Groundwater is the source of water in wells and provides water for plants through their roots. Eventually all groundwater reaches the oceans, thereby completing the water cycle.

B. POLLUTANTS AND OTHER IMPACTS ON STREAMS

1. Point and Nonpoint Source Pollution

Water pollution originates from either nonpoint or point sources. Nonpoint sources (NPS) include surface runoff, atmospheric deposition, and groundwater flow. Because of their diffuse and intermittent nature, NPS are difficult to control. NPS pollutant loads are greatest following rainfall and high flow events. A significant part of the NPS load consists of nutrients, including nitrogen and phosphorus (organic matter, fertilizer), which stimulate algal growth. Other NPS pollutants are sediment (from erosion, construction sites, and stream banks during high-flow, high-velocity

conditions), toxics (oil, paint, pesticides, chemicals, and metals), pathogens-fecal coliform bacteria (animal waste, failing septic systems, and leaking sewer systems), and trash.

Point sources are specific locations that discharge pollutants such as a discharge pipe. Because they are relatively constant and provide a steady flow of pollutants, they are easier to monitor and control. In the Potomac Basin, most point sources are wastewater treatment plants (WWTPs) or industrial discharges. Unlike NPS, point sources contribute relatively small portions of the nutrient loads during high flows and the majority during low flows.

2. The Effect of Imperviousness on Streams

As development occurs, natural areas that once had vegetative cover capable of absorbing water and filtering pollutants are replaced by impervious surfaces such as roads, driveways and buildings. With the increase in impervious surface and loss of vegetative cover, there is a concurrent increase in the amount and speed of stormwater runoff flowing into streams. Increased uncontrolled runoff causes stream erosion, resulting in scouring, down-cutting and over-widening of stream channels, and loss of riparian vegetation. Loss of shade results in increased water temperatures. During summer storms, runoff from heated impervious surfaces also raises water temperatures. In urban and suburban watersheds, rain flows off impervious surfaces such as parking lots and highways, carrying oil and other automobile wastes into streams. When stream channels become incised from down-cutting, they become disconnected from their floodplains. Water cannot get out of the banks onto the adjacent floodplain where flows can be dissipated and drop their sediment loads. High flows stay in the channel, resulting in increased erosion. Silt and sediment from erosion smother the stream bottom and destroy in-stream habitat for sensitive benthic macroinvertebrates.

Simultaneously, this results in an increased number of floods in downstream areas, due to the increased volume of water. Over time, increased erosion, flooding, and sediment deposition leads to habitat loss, water quality problems, and damage to utilities and infrastructure.

C. WATER RESOURCE ANALYSES

The Fairfax County Department of Public Works and Environmental Services (DPWES), Virginia Department of Environmental Quality (VDEQ), and other organizations and agencies regularly conduct water quality monitoring and testing. The Audubon Naturalist Society, the Northern Virginia Soil and Water Conservation District, and the Health Department Adopt-A-Stream program also provide volunteer data. DPWES continues to conduct comprehensive monitoring of Fairfax County streams. All of these data help provide a comprehensive understanding of the condition and health of Fairfax County's water resources.

1. Countywide Watershed and Stream Assessments

a. Stream Protection Strategy Baseline Study

The Stream Protection Strategy Baseline Study, published in 2001, continues to be a valuable data source, providing a holistic ecological assessment of county streams. The study provides information on fish taxa, benthic macroinvertebrates, general evaluation of watershed and stream features, and calculations of the percent impervious cover within each watershed.

In 2004, the county's strategy for biological assessment sampling was re-evaluated to establish long-term goals. To meet these goals, it was decided that in lieu of resampling the 20 to 25% of the baseline study monitoring sites on an annual basis, it would be more beneficial to infer annual countywide stream conditions and trends from a probability-based sampling procedure. Additionally, data from various volunteer biological monitoring activities (Northern Virginia Soil and Water Conservation District and Audubon Naturalist Society) would be used for site-specific trend evaluations. Additional information on volunteer monitoring programs will be provided later in this chapter.

The Stream Protection Strategy Baseline Study can be viewed online at:
http://www.fairfaxcounty.gov/dpwes/environmental/sps_main.htm.

2004 Update on Countywide Stream Assessment

Thirty sites were sampled for benthic macroinvertebrates and 14 sites were sampled for fish. Reference sites in Prince William Forest Park continue to be monitored on an annual basis. Results from the sampling indicated that three-quarters of the county's streams are in fair to poor condition.

Future sampling sites will continue to be randomly distributed throughout the county. Project specific monitoring will also occur as more and more stream restoration and low impact development (LID) projects are implemented throughout the county.

The 2004 report should be available on-line as data analysis is completed at:
http://www.fairfaxcounty.gov/gov/DPWES/environmental/SPS_Main.htm.

b. Countywide Stream Physical Assessment

In February 2004, the Stream Physical Assessment Study was completed, which will provide the majority of the field reconnaissance data for the county's watershed management plans. The study provides information on habitat conditions, impacts on streams, general stream characteristics, and geomorphic classification of stream type. Copies of the Countywide Stream Assessment may

be requested by contacting the Fairfax County Stormwater Planning Division at 703-324-5500.

c. Volunteer Water Quality Monitoring Programs

i. Northern Virginia Soil and Water Conservation District (NVSWCD)

The Northern Virginia Soil and Water Conservation District (NVSWCD) coordinates and manages a volunteer stream monitoring program in Fairfax County. The program includes training and certification of volunteer monitors, equipment, data management and analysis, and quality control. Four times a year, volunteers conduct biological and chemical monitoring and a habitat assessment, using the Save Our Streams protocol. Volunteers assess and evaluate water quality based on the type and diversity of benthic macroinvertebrates. Monitors conduct water chemistry tests for temperature, turbidity, and nitrates to assess the water quality. Observations of the surrounding watershed, including land uses, the amount of streamside and stream bank vegetation, tree canopy, erosion, and signs of other pollution are also evaluated. In 2004, there were 53 active sites.

The certified data are forwarded to Fairfax County, Virginia Department of Environmental Quality, Virginia Save Our Streams, and other interested organizations. This program helps supplement the county monitoring program.

ii. Audubon Naturalist Society (ANS)

ANS also manages a volunteer water quality monitoring program in the region that currently includes 16 monitors in Fairfax County, with an average of four monitors for each of the four sites in Fairfax County. Two sites are in E. C. Lawrence Park and are monitored by Park staff. The ANS program uses a modified version of the EPA's Rapid Bioassessment II protocol, which includes assessment of in-stream and streamside habitat parameters and a survey of benthic macroinvertebrate populations. There are three required monitoring sessions (May, July, and September) and an optional winter monitoring session between December and February. ANS staff performs data entry and quality control activities. ANS also furnishes all monitoring equipment and training. Monitor training includes macroinvertebrate identification (order and family level), protocol practicum, habitat assessment, and benthic macroinvertebrate adaptations. Monitors are recruited in semi-annual introductory workshops. The water quality monitoring program is part of a larger watershed awareness program that includes slide show and video presentations, watershed walks, and other presentations.

iii. Fairfax County Park Authority

Site staff at Ellanor C. Lawrence Park have conducted stream studies (primarily of benthic macroinvertebrates) at Walney Creek, Big Rocky Run, and Courthouse Spring Branch four times per year.

Water quality monitoring at six stations within Huntley Meadows Park resumed in 2005.

2. Fairfax County Water Quality Monitoring

a. Bacteria Monitoring

In 2004, the Fairfax County Stormwater Planning Division (SWPD) took over the bacteria monitoring program, previously conducted by the County Health Department. Samples were taken to determine concentrations of fecal coliform bacteria. The 80 original sampling sites were divided into nine sections. Each section was sampled four times in 2004. In addition to measuring fecal coliform concentrations, *Escherichia coli*, or *E. coli*, concentrations were also measured based on the EPA recommendation to use *E. coli* levels to determine possible health concerns. *E. coli* bacteria are found in the intestinal tracts of warm-blooded animals, including humans, and therefore can be indicative of fecal contamination and the possible presence of a pathogenic organism. Over 300 samples were taken from 25 watersheds in 2004. SWPD also took samples to determine the levels of nitrates and phosphates as a secondary test for potential human inputs.

In 2004, SWPD began the use of Optical Brighteners Monitoring (OBM) to identify illicit waste discharges into the streams. A representative from the U.S. Environmental Protection Agency trained SWPD staff how to conduct OBM. OBM can be used in upper sections of a site's sub-watershed where streams regularly have high bacteria concentrations.

In 2003, the Department of Environmental Quality (DEQ) adopted a more stringent bacteria standard for primary contact recreation to all surface waters of the state. This action was taken as part of Virginia's commitment to attain the national goal of water quality of surface water for all types of recreation. According to these standards, the following standards now apply:

- Fecal coliform bacteria shall not exceed a geometric mean of 200 fecal coliform bacteria per 100 ml of water for two or more samples over a calendar month.
- No more than 10 percent of the total samples taken during any calendar month can exceed 400 fecal coliform bacteria per 100 ml of water.
- *E. coli* shall not exceed a geometric mean of 126 bacteria per 100 ml of water or exceed an instantaneous value of 235 bacteria per 100 ml of water.

In 2004, 24 percent of fecal coliform samples taken by SWPD staff were in the acceptable water quality range (less than 200 f.c./100 ml of water). The 18-year average is 26 percent. The percentage of samples with fecal concentration less than 400 fc/100ml decreased to 28% in 2004 from 32% in 2002.

All sites where at least four samples were taken exceeded concentrations of 400 fc/100 ml at least once. The vast majority of sites (97%) exceeded 400 fc/100ml two or more times. This seems to indicate that there is a problem with fecal coliform contamination in both rural and urban areas of the county.

In addition to bacteria monitoring, SWPD staff also measured chemical parameters including pH, water temperature, nitrate nitrogen, phosphorus, dissolved oxygen, and specific conductance.

b. Dissolved Oxygen

The presence of dissolved oxygen (D.O.) is essential for aquatic life, and the type of aquatic community is dependent to large extent on the concentration of dissolved oxygen present. Dissolved oxygen standards are established to ensure the growth and propagation of aquatic ecosystems. The minimum Virginia state standard for dissolved oxygen is 4.0 mg/l.

Over 99% of the samples collected for determination of D.O. were above the 4.0 mg/l range. The sample below the acceptable level was recorded in September. The average D.O. measurement in 2004 was 10.80 mg/l.

c. Nitrate Nitrogen

Nitrate Nitrogen is usually the most prevalent form of nitrogen in water because it is the end product of aerobic decomposition of organic nitrogen. Nitrate from natural sources is attributed to the oxidation of nitrogen in the air by bacteria and to the decomposition of organic material in the soil. Fertilizers may add nitrate directly to water resources. Deposition of nitrogen compounds from air pollution also occurs. Nitrate concentrations can range from a few tenths to several hundred milligrams per liter. In non-polluted water, they seldom exceed 10 mg/l. Nitrate is a major component of human and animal wastes, and abnormally high concentrations suggest pollution from these sources.

The samples for nitrate nitrogen ranged from a low of 0.10 mg/l to a high of 4.61 mg/l. The average was 1.25 mg/l, well below the maximum contaminant level of 10 mg/l. This is higher than the average of the prior year's sampling results of 0.5 mg/l.

d. Phosphorus (Total)

Phosphorus is found in natural water in the form of various types of phosphates. Organic phosphates are formed in the natural biological process--by organisms existing in the water, contributed to sewage in body wastes and food residues, and/or formed in the biological treatment process for sewage. Condensed phosphates and orthophosphates are found in treated wastewater, laundry detergent, commercial cleansing compounds, and fertilizers. Phosphorus is essential to the growth of organisms and is usually the nutrient that limits growth of organisms in a body of water. Therefore, the discharge of raw or treated sewage, agricultural drainage, or certain industrial wastes may stimulate nuisance quantities of photosynthetic aquatic organisms and bacteria.

There is no established limit for phosphorus in stream water. The average phosphorus measurement was 0.11 mg/l. This year's average does not indicate a significant increase over the prior year's average.

e. Temperature

The existence and composition of an aquatic community also depends greatly on the temperature characteristics of a body of water. The maximum standard for free flowing streams is 89.9° F (32° C).

The temperature range for all stream water samples was -0.23° C for the low in February and 27.0° C for the high in September. The average temperature was 12.98° C.

f. pH

Stream pH is an important factor in aquatic systems. The pH range of 6.0 – 9.0 generally provides adequate protection of aquatic life and for recreational use of streams.

The pH ranged from a low reading of 5.95 to a high of 8.87 for all samples. Five samples were above the 8.5 limit and one sample was below the 6.0 limit.

Data from the 2004 sampling will be available in the SWPD Comprehensive Monitoring Report in 2005.

3. Virginia Department of Environmental Quality (DEQ)

The DEQ performs long-term trend monitoring at 14 streams that are either in Fairfax County or border the county. Additionally, DEQ has eight monitoring stations in the county. Monitoring began in July, 2004 and will continue for two years. DEQ will be doing biological monitoring at four stations in the county. Failure to meet designated

water quality standards may result in a stream being placed on the 303(d) list for impaired state waters.

a. Occoquan River and Basin Management

The Occoquan River straddles the southern border of Fairfax County and the northern border of Prince William County. The River has been dammed near the town of Occoquan. The Occoquan Reservoir, created by the damming, serves as one of two primary sources of drinking water for Fairfax Water (formerly the Fairfax County Water Authority), which operates a facility and withdraws water from the Reservoir. Because of its use as drinking water, water quality in the Reservoir is highly monitored and water from sewage treatment plants entering the Reservoir is highly treated.

i. Upper Occoquan Sewage Authority (UOSA)

The following information has been excerpted directly from information provided by UOSA:

UOSA operates an advanced water reclamation facility in Centerville, Virginia and serves the western portions of Fairfax and Prince William Counties, as well as the Cities of Manassas and Manassas Park. The water reclamation plant includes primary-secondary treatment followed by advanced waste treatment processes: chemical clarification, two-stage recarbonation with intermediate settling, multimedia filtration, granular activated carbon adsorption, chlorination for disinfection, and dechlorination. The plant's rated capacity is 54 million gallons a day (mgd) as of January, 2005 following the 2004 substantial completion of UOSA's expansion to that capacity.

UOSA operates under a Virginia Pollutant Discharge Elimination System (VPDES) Permit, which is issued by the Department of Environmental Quality (DEQ). The permit limits and 2004 plant performance are listed in Table III-1.

Table III-1. UOSA Permit Requirements and 2004 Performance		
Parameter	Limit	Performance
Flow	32 mgd	27.2 mgd
Chemical oxygen demand	10.0 mg/l	<5.0 mg/l
Turbidity	0.5 NTU	<0.1 NTU
Total Suspended Solids	1.0 mg/l	<0.1 mg/l
Total Phosphorus	0.1 mg/l	0.05 mg/l
Surfactants	0.1 mg/l	<0.01 mg/l
Total Kjeldahl Nitrogen	1.0 mg/l	0.10 mg/l
Disinfection Minimum Chlorine Residual	0.6 mg/l	0.77 mg/l
Dechlorination Chlorine Residual (mg/l)	Non detect	Non detect

Source: Upper Occoquan Sewage Authority

In 2004, the maximum influent 30-day average flow of 29.9 mgd. The influent highest rolling 30-day flow was observed during the 30-day rolling period ending on January 4, 2004 at 35.92 mgd. The UOSA Plant continues to produce high quality reclaimed water.

UOSA produces and treats two types of residuals: biosolids from conventional treatment and lime solids from chemical treatment. Anaerobic digestion decomposes the biosolids to relatively stable compounds. In addition to anaerobically digesting the biosolids, in 2004 UOSA commended the operation of its rotary pelletizer dryer and is producing Exceptional Quality (EQ) biosolids. EQ biosolids have commercial potential in the direct agricultural market.

Thickened lime residuals are gravity thickened and dewatered on the recessed chamber filter presses. All lime solids are landfilled on site in a permitted industrial landfill.

ii. Occoquan Watershed Monitoring Laboratory (OWML)

The Occoquan Watershed Monitoring Program (OWMP) is administered by the OWML and has been in operation since 1972. It is funded by Fairfax Water and the six jurisdictions within the watershed: Fairfax, Prince William, Loudoun, and Fauquier Counties; and the Cities of Manassas and Manassas Park. The program consists of nine (9) stream monitoring stations (automated flow monitoring at all and storm sampling at most) and four (4) Occoquan Reservoir stations. Base flow sampling in the streams and all sampling in the Reservoir is done manually. In addition to surface and bottom water samples, profiles of DO, temperature and pH are also obtained at the Reservoir stations. Sampling is done weekly during the growing seasons and biweekly or monthly (if ice is present) in winter. The water quality data that have been provided in past years indicate little change in water quality in the watershed. The Lake Manassas program is used for monitoring water and sediment at seven (7) stream stations and eight (8) lake stations. The eutrophication status of the Occoquan Reservoir and Lake Manassas were within the same range as before--moderately eutrophic but holding steady.

The OWML monitors quarterly for organic synthetic organic compounds (SOCs) in the watershed in a program established under the recommendation of EQAC in 1982 for water samples. In 1988, the OWML began monitoring sediment and fish samples within the reservoir for SOCs. The Lake Manassas program also funds monitoring of SOCs at its stations. The most frequently detected SOC is Atrazine, usually detected in springtime and early summer when it is being land applied. Concentrations "are usually lower" than the maximum contaminant level (MCL) of three micrograms/liter for drinking water. The pesticide Dual (metolachor) and phthalates are regularly found in concentrations one or more order of magnitude below the MCL.

No sampling results were available for 2004 or 2005.

b. Noman M. Cole Jr. Pollution Control Plant (NMCPCP)

The NMCPCP, located in Lorton, is a 54 million gallon per day (mgd) advanced wastewater treatment facility that incorporates preliminary, primary, secondary, and tertiary treatment processes to remove pollutants from wastewater generated by residences and businesses in Fairfax County. The original plant, which began operation in 1970 at a treatment capacity of 18 million gallons a day (mgd), has undergone two capacity and process upgrades to meet more stringent water quality standards. After treatment, the wastewater is discharged into Pohick Creek, a tributary of Gunston Cove and the Potomac River. The plant operates under a VPDES permit. The plant is required to meet effluent discharge quality limits established by the Virginia Department of Environmental Quality (DEQ). Table III-2 presents the facility's performance and current effluent monthly limitations.

Table III-2		
NMCPCP Permit Requirements and 2004 Performance Averages		
Parameter	Limit	Performance
Flow	54 mgd	41.91 mgd
CBOD ₅	5 mg/l	< 2 mg/l
Suspended Solids	6 mg/l	1.9 mg/l
Total Phosphorus	0.18 mg/l	<0.06 mg/l
Chlorine Residual	0.008 mg/l	0.008 mg/l
Dissolved Oxygen	6.0 mg/l (minimum)	9.0 mg/l
pH	6.0-9.0 (range)	7.1
E. coli Bacteria	126/100mls*	< 1/100mls*
Total Nitrogen	No Limit	< 6.2 mg/l

Source: Department of Public Works and Environmental Services

*Geometric mean

Construction to expand the plant treatment capacity to 67 mgd began in 1997 and was completed in July, 2005. This includes process upgrades to remove ammonia to less than one mg/l and total nitrogen to less than eight mg/l in order to meet Virginia Water Quality Standards and the Chesapeake Bay Program goals for total nitrogen. Also included in the project are: flow equalization tanks, a new/upgraded laboratory for water quality testing, upgraded odor control systems, new instrumentation and control systems, and a new septage receiving facility.

In 2004, 56,584 wet tons of sludge were generated and incinerated.

In August, 2004, the Virginia Secretary of Natural Resources announced proposed changes to nutrient discharge limits for sewage treatment facilities in Virginia's portion of the Chesapeake Bay watershed. These proposed changes will limit nutrient discharges from the NMCPCP and require substantial modifications.

4. Individual Stream Reports and Programs

a. TMDLs (Total Maximum Daily Loads)

A total of 19 water bodies with drainage areas in Fairfax County are included in Virginia's listing of impaired waters for 2004. Of the listed waterbodies, 12 are riverine systems totaling 58.45 miles, six are estuarine with a total area of 23.23 square miles, and one is a drinking water reservoir (Occoquan) with an area of 1,700 acres. Ten of the 17 waterbodies are multijurisdictional. The cause of the impairment for the majority of riverine systems is either fecal coliform or declining populations of benthic macroinvertebrates. For the estuarine waterbodies, the cause of impairment for the majority is fecal coliforms and/or PCBs in fish tissue. According to the schedule, seven water bodies require TMDL studies to be completed by 2010, nine by 2014, and three by 2016. Popes Head Creek and Bull Run TMDLs are to be developed by 2006, and TMDLs for the lower section of Accotink Creek and for Difficult Run are to be developed by 2008.

i. Accotink Creek TMDL

Due to excessive fecal coliform bacteria counts, a 4.5 mile segment of Accotink Creek in Fairfax County, beginning at the confluence of Crook Branch and Accotink Creek to the start of Lake Accotink, was placed on the 1998 Virginia 303(d) TMDL (Total Maximum Daily Load) list. A TMDL is a highly structured, watershed-specific plan for bringing an impaired waterbody into compliance with the Clean Water Act goals. A two-year study began in December, 1998, headed by the U.S. Geological Survey, in partnership with the Virginia Department of Conservation and Recreation (DCR), the Virginia Department of Environmental Quality (DEQ), and Fairfax County. The initial study was completed in fall, 2001. The sample collection and analysis, which began in April, 1999, to determine the "type" of fecal coliform bacteria found in streams is now complete. Results of this analysis are discussed in Chapter VII of this report, with Figure VII-2-1 (see page 226) presenting a breakdown of sources of fecal coliform bacteria. The most significant identified sources were geese, humans, and dogs, with ducks, cats, seagulls, raccoons, rodents, cattle, and deer also identified as sources. A draft TMDL has been published by the Virginia Department of Environmental Quality. The draft TMDL includes a goal to reduce the human sources of fecal coliform bacteria by 99%. A study by USGS initiated in the August of 2001 will identify and isolate the specific sources of human fecal coliform bacteria. The study will be conducted over a three-year period. During 2002, an extensive Dry Weather Screening program

was undertaken in the Accotink Creek Watershed as part of the ongoing efforts to detect illicit connections and improper discharges. In 2003, due to large amounts of rain, scheduling sampling campaigns became extremely difficult. Only one in April was completed. To date, five sampling campaigns of the eight planned have been completed. Throughout the final campaigns, there will be continued focus on storm drains that flow during dry periods and sampling of locations with elevated fecal coliform bacteria levels. The USGS paper on sampling Accotink Creek can be viewed on-line at:
<http://water.usgs.gov/pubs/wri/wri034160/wrir03-4160.htm>.

The field investigation portion of a 3-year follow up study was USGS on sources of human waste being discharged into Accotink Creek was completed. The results are being compiled and will be used to identify “hot-spots” for remedial work and inclusion in the TMDL implementation plan.

ii. Four Mile Run TMDL and the Four Mile Run Program

Although only the very upper reaches of Four Mile Run occur in Fairfax County, it is important to note the existence of a TMDL for Four Mile Run and the participation of Fairfax County in the Four Mile Run Program.

The Four Mile Run Program is the oldest continually active program of the Northern Virginia Regional Commission (NVRC). The four jurisdictions (Arlington County, Fairfax County, the City of Falls Church and City of Alexandria) through which Four Mile Run flows are involved in the program. The program was founded in 1977 to ensure that future development would not result in increased flooding in the watershed. Today, all development and redevelopment is analyzed through the Four Mile Run Computer Model to determine whether on-site detention of stormwater runoff is necessary to prevent downstream flooding. In 1998, the Four Mile Run Agreement was amended to address urban water quality issues in addition to flooding.

The Four Mile Run Fecal Coliform Study to determine the sources of fecal coliform bacteria in the watershed using DNA was completed in 2000. The study found that waterfowl contribute over one-third (31%) of that bacteria that could be matched. Eighteen percent of the bacteria originated from humans, 13% from dogs, 6% from deer, 19% from raccoons, and 13% from other sources. Bacteria from humans appear to be highly localized. There were indications in that, without regard to specific host animals, *E. coli* bacteria seem to regrow, through cloning, within the storm drains and stream sediments, which in turn perpetuates bacteria levels. Efforts are underway to study this hypothesis.

NVRC was given a grant from the Virginia Department of Environmental Quality (DEQ) for the development of a TMDL (Total Maximum Daily Load) for bacteria in Four Mile Run, which was approved by the EPA on May 31,

2002. The draft implementation plan was presented for public comment on December 10, 2003; its focus is on the reductions of fecal coliform bacteria from human and canine sources by 98 percent. The plan was finalized on December 20, 2003 and can be viewed on-line at:
www.novaregion.org/bacteriaimplementation.htm

Fairfax County completed a list of actions required by the Four Mile Run Implementation Plan. The progress made toward obtaining water quality standards will be assessed in five year increments.

iii. Bull Run and Popes Head Creek TMDL

NVRC has been approached by the Virginia Department of Environmental Quality concerning the development of TMDLs for impaired streams in the Occoquan watershed. The first two will be for streams outside Fairfax County, Licking Run and Cedar Run. However a TMDL addressing degradation of the streams' benthic communities is scheduled to be completed for Bull Run and Popes Heads Creek in Fairfax by 2008.

b. Kingstowne Stream Restoration Project

In 1998, Fairfax County, the Northern Virginia Soil and Water Conservation District, the U.S. Natural Resources Conservation Service, and two citizens groups (the Friends of Huntley Meadows and the Citizens Alliance to Save Huntley) formed a partnership to restore a stream in the Kingstowne area of the county. The Kingstowne stream is a tributary of Dogue Creek and is upstream of Huntley Meadows Park. Started in October and finished by December, 1999, the Kingstowne Stream Restoration Project is now functional. The project used natural principles of geomorphology and soil bioengineering to create gentle meanders that slow the velocity of flow, and used natural vegetation to stabilize the stream banks. Testing has substantiated that erosion has been brought under control and water quality downstream is improved. During 2004, 20 storm event samples and 12 base flow samples were collected and analyzed to determine pollutant loads in Dogue Creek. Based on the monitoring data, the sediment removal efficiencies were achieved for all storm events. The phosphorus removal rate did not meet permit requirements of 50% removal so DPWES is working with the Army Corps of Engineers to resolve the problem. The NVSWCD continues to monitor the project, which continues to improve bank and floodplain stability.

c. Gunston Cove Aquatic Monitoring Program

Gunston Cove is the site of the outfall of Fairfax County's Noman M. Cole, Jr. Pollution Control Plant. The primary objective of this George Mason University program is to determine the status of the ecological communities and physical-chemical environment in the Gunston Cove area of the tidal Potomac for evaluation of long-term trends. This should provide the basis for well-grounded management

strategies to improve water quality and biotic resources in the tidal Potomac. It was recommended in this final report that long term monitoring should continue.

Water quality has generally improved since the 1980s. Long-term trends were examined for a wide range of water quality and biological parameters. The analysis of water quality parameters focused on growing season values (June to September). Both LOWESS (locally weighted sum of squares) trend lines and linear regressions were examined to allow detection of long-term trends. In the cove, chlorophyll a, a photosynthetic rate, biochemical oxygen demand (BOD), volatile suspended solids (VSS), total phosphorus, and organic nitrogen had significant regression coefficients indicating a net decrease over the study period (1983/4-2003). Nitrate nitrogen and total suspended solids (TSS) have also exhibited significant declines over the whole study period. Ammonia nitrogen has clearly declined since 1989. These results are consistent with a significant decline in phytoplankton biomass in the cove over the study period. Phytoplankton cell densities have also declined in the past two years. Secchi disc, a measure of water clarity, has demonstrated a steady and significant increase due to lower chlorophyll a and TSS. Water clarity is improving to the point that light levels in the cove are becoming more suitable for submerged aquatic vegetation (SAV).

Algae concentrations are at lower levels than in the mid 1980s, probably due to lower phosphorus levels in the water, and zooplankton (microscopic “animals” found in surface waters) levels have increased. Benthic (bottom dwelling) organism levels are greater in the river channel than in the cove.

In the cove in 2002, white perch has remained dominant at steady levels over the period, suggesting a supportive environment. Bay anchovy and blueback herring comprised a significant percentage of the total trawl catch. Banded killifish dominated the seine collection and may reflect an increase in habitat as submerged aquatic vegetation has increased in the cove. Water quality in Pohick Creek remains good enough to support spawning alewife and gizzard shad.

The report suggests goals to reduce man-made stresses that we can, and reduce or manage those we cannot, eliminate. Specific management practices to control point and nonpoint sources, protect and enhance stream buffers and tidal wetlands, and avoid further exotic species introductions are recommended. Continuation of the monitoring program to assess effective management is also recommended. The 20-year record of data from Gunston Cove and the nearby Potomac River is starting to reveal many interesting long-term trends that will aid in the continued management of the watershed and point source inputs.

d. Wetlands Mitigation Monitoring

The Virginia Department of Transportation is currently monitoring three wetland mitigation projects, one between Dranesville Road and Sugarland Run in Dranesville District, one near Roberts Parkway Overpass and Virginia Railway

Express-Burke station in Braddock District, and one at Lee Highway and Big Rocky Run in Sully District. These sites were created to mitigate impacts from the construction of the Fairfax County Parkway, Roberts Parkway Bridge Overpass, the Springfield Interchange, and the Route 29 bridge replacement over Big Rocky Run. All sites require five-year success monitoring. The Braddock site was just planted in 2003 and the Dranesville site has been monitored for two years. The results at all three sites have been impressive with each site fulfilling success criteria outlined in the water quality permits. These sites provide a water quality benefit in these watersheds as well as habitat for a host of amphibians, birds and mammals.

e. Illicit and Potential Hazardous Material Discharges

In calendar year 2004, the Hazardous Materials and Investigative Services Section of the Fairfax County Fire and Rescue Department responded to reports involving 29 improper disposals of various hazardous materials and solid waste, nine pipeline incidents, 280 petroleum product releases, and 67 various other types of product release. In 36 cases, storm drains and creeks/streams were directly contaminated. Major incidents for 2004 included 275 gallons of off-road diesel fuel being discharged into the Potomac River and 275 gallons of waste motor oil being discharged into Tripps Run and Lake Barcroft.

f. Investigations of Contamination caused by Leaking Underground Storage Tanks

In 2004, there were 132 reported incidents investigated by the Virginia Department of Environmental Quality, of which 36 remain open for ongoing scrutiny. As of June, 2005, there were a total number of 2,101 cases, of which 157 remain open.

D. PONDS AND LAKES

All ponds and lakes in Fairfax County are man-made by excavation and/or the damming of streams. These open water impoundments have their own aquatic communities and have many of the same organisms as streams. Most provide recreational opportunities for humans. Due to increased runoff in more urbanized areas, they are often subject to heavy sediment and nutrient loads. Heavy sedimentation means that most of the lakes have to be dredged on a regular basis in order to maintain pond or lake depth. Heavy nutrient loads result in large algal and plant blooms over the warmer months of the year.

1. Reston Lakes

The Reston Association (RA), the homeowners association for the large, planned community of Reston (population > 60,000), has an active watershed and lakes management program that focuses on the monitoring and improvement of water quality. RA manages and monitors four lakes, Audubon, Anne, Thoreau, and Newport, and two ponds, Bright and Butler.

a. Management Initiatives

RA is actively involved in public education and innovative approaches to erosion and drainage control. Examples of watershed management practices in Reston include: water quality monitoring; stream bank and shoreline stabilization; erosion abatement; fisheries monitoring; SAV planting; algae and invasive aquatic weed control; waterfowl management; trash removal; dredging; and riparian buffer restoration.

In 2004, RA worked with several clusters and individual homeowners and conducted several shoreline stabilization projects using biologs, erosion cloth, and native plantings. RA continues to promote natural shoreline stabilization and encourages the use of more environmentally sensitive materials for docks such as recycled plastic materials as opposed to conventional pressure-treated timber.

RA continued its Canada goose management initiatives in an effort to control the population on its lakes. In 2004, 27 goose nests were located and mapped and 58 eggs were added.

RA continued to work with Northern Virginia Stream Restoration, L.C., (NVSR) to help coordinate and establish the Reston stream mitigation bank. The project will implement the recommended stream restoration projects outlined in the Reston Watershed Management Plan. A team of regulatory agencies, including the US Army Corps of Engineers, the US Environmental Protection Agency, the US Fish & Wildlife Service and the Virginia Department of Environmental Quality, will oversee the progress of the bank.

Volunteers and RA staff monitor Reston's streams four times a year using the Virginia Save Our Streams protocol. In 2004, data were collected at eleven volunteer stream monitoring sites. RA works closely with the Northern Virginia Soil and Water Conservation District program and co-hosted an Introductory Stream Monitoring Workshop in February, 2004.

RA revised and completed the *Understanding, Preserving, and Enjoying Reston's Lakes and Streams* booklet (second edition). RA also produced and printed the *Help Our Watersheds – Living in the Potomac and Chesapeake Watershed* brochure to help educate residents about simple things they could do to control runoff, prevent and manage erosion, and help Reston's water resources. Funding for the brochure was made possible by a grant from the Chesapeake Bay license plate fund. The brochure has been distributed via mailings, at festivals, and in posted brochure boxes along pathways; the brochure is also included in welcome packets to new residents.

b. Monitoring and Results

Reston's lakes are monitored six times per year (April through September) by a lake management consultant. RA has been monitoring water quality in its lakes since 1981; Lake Newport was added to the monitoring program in 1992. Each month (April through September), dissolved oxygen, dissolved oxygen saturation, temperature, pH, conductivity, total phosphorus, Secchi depth transparency, chlorophyll a, phytoplankton, and zooplankton are measured. Fecal coliform and *E. coli* testing were conducted in Lake Audubon for a second year in preparation for annual swimming events. Reston's lakes' primary issues continue to be accelerated sedimentation, algae blooms, loss of oxygen throughout the water column, trash, and nuisance invasive vegetation.

The following summary is from the 2004 Reston Lakes Annual Monitoring Report prepared by Bill Kirkpatrick and Kevin Laite with Aquatic Environment Consultants, Inc.:

i. Lake Anne

The aeration system continued to help reduce dissolved oxygen depletion. There was no change in temperature from the surface to the bottom of the lake, therefore there was no thermocline present this season. The pH levels were higher than last season; the average was 7.1. Conductivity levels were below average. The average Secchi depth of one meter was the lowest to date and well below the long-term average. Reduced water clarity was the result of large, nuisance green and green-blue algae blooms, which plagued the lake during most of the season. The seasonal average for chlorophyll a was the highest on record. Phosphorus levels followed the chlorophyll trend. Zooplankton density remained low and was well below the long-term average.

ii. Lake Audubon

The lake showed signs of thermal and oxygen stratification in April. Water temperatures were below average. Dissolved oxygen levels in the bottom portion of the lake were above average. The pH levels were higher than average and the conductivity levels were lower than average. Secchi depth was 1.6 meters, still below the long-term average of 1.8 meters. Chlorophyll a levels were record high for the third year in a row. Blue-green algae blooms were present July through September. Zooplankton populations were exceedingly low and well below average. Lack of spring blooms and suppression of phytoplankton dramatically impacted zooplankton populations.

iii. Lake Thoreau

Thermal and oxygen stratification occurred by early May. Overall the oxygen levels in the lake were the highest of all of the Reston lakes. Water temperatures were slightly above average. The pH levels were up from 2003 but still below average. Conductivity levels continue to be above the long-term average. The average Secchi depth was 2.8 meters was deeper than recent years. Water clarity continues to be the best of all the lakes. The seasonal average chlorophyll concentration was above average with a large golden-brown algae bloom occurring in April. As with the other lakes, zooplankton populations were exceedingly low. The density was the second lowest since 1991.

iv. Lake Newport

As with the other lakes, thermal and oxygen stratification occurred early in the season, although the lake did not stratify quite as shallow as it has in the past. Dissolved oxygen levels did show improvement this year. The pH levels were higher than last season. Conductivity levels were also higher. Water clarity remained the same as last year's record low. Blue-green and golden-brown algae blooms plagued the lake throughout the season resulting in low Secchi depth measurements. Chlorophyll levels continued to be higher than average. There was a large bloom in July, which impacted water clarity. Zooplankton populations peaked in May but were still exceedingly low as consistent with the other lakes.

2. Pohick Watershed Lakes

The six Pohick watershed lakes (Barton, Braddock, Huntsman, Mercer, Royal, and Woodglen) are inspected annually for dam structure but are not monitored for biological or chemical parameters.

3. Lake Barcroft

The Lake Barcroft Watershed Improvement District (WID) is a local taxing district authorized by Virginia Law for conservation purposes. In 1999, Lake Barcroft had about 15,000 cubic yards of dredge spoil from the lake to dispose of. In order to avoid the costs associated with hauling it to a landfill, they rented a huge topsoil screening machine and excavator to load it, converting the waste material into topsoil by filtering out all the sticks, stones, beverage cans and other debris. The topsoil was then made available to local residents for a modest delivery fee. Some innovative BMPs (Best Management Practices), such as flow regulators, check dams, a diversion debris trap, a stormwater injection pit, and street sweeping program have been implemented by the WID. These BMPs are being studied for both their capacity to reduce pollution and improving water quality in the lake and its tributaries, possibly leading to countywide

implementation. The WID also has a program to purchase and distribute high quality lawn fertilizer (that has been formulated without phosphorus) in 50-pound bags and sell it to homeowners. The WID also did a fish flesh study by sending edible portions of fish removed for analysis of toxins and heavy metals. Fish studied were Largemouth Bass, Bluegill, and Black Crappie. None of the counts were over EPA warning levels. The WID is planning its next large-scale dredging event (approximately 12,000 cubic yards) for 2006; however, there are concerns with the lack of nearby disposal areas to reduce dredge disposal costs.

4. Lake Accotink

Lake Accotink is owned and managed by the Fairfax County Park Authority. County government has authorized the expenditure of \$6,000,000 to dredge and remove 200,000 cubic yards of sediment from the lake. The Fairfax County Park Authority provides a boat and operator to the Fairfax County Health Department, which conducts water quality tests from four surface points from May through August. Results from the sampling were within the required limits as mentioned in the Health Department Stream Report. This sampling will now be part of the DPWES monitoring program.

5. Other Ponds and Lakes

There are other significantly sized private and public lakes within the county. Many are centered within developments and have dwellings built along the banks of the lakes. There are also numerous smaller ponds throughout the county that are found within communities, commercial developments or on farm properties. Some are associated with golf courses and many serve as stormwater management ponds.

E. STORMWATER MANAGEMENT

1. Status of a Dedicated Stormwater Utility Concept in Fairfax County

In December, 1998, a draft report by the Stormwater Utility Advisory Group (SUAG) to the Board of Supervisors was circulated for review. The report addressed several issues relating to the implementation of a stormwater service charge program for Fairfax County. Activities were suspended leading up to the fall, 1999 Board of Supervisors elections. During the summer of 1999, the firm of Camp, Dresser and McKee (CDM) was requested to develop a concept paper/report on framing significant aspects of the county's existing stormwater control program and present ideas and recommendations on the essential elements of future stormwater program. In 2004, Fairfax County, with assistance from a consulting firm, developed a Watershed Community Needs Assessment and Funding Options Study to address the strategies for developing a comprehensive stormwater management program and a dedicated funding mechanism to support it. During the 2005 budget proposal hearing, the county set aside a penny of every dollar of the real estate tax, which equates to \$17.9 million, to be dedicated to stream restoration and protection programs. This will take the place of the stormwater utility in the near future.

2. Status of NPDES Requirements

The National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System Permit (MS4), a five year permit, was reissued by the Virginia Department of Environmental Quality (DEQ) in January, 2002. Total Maximum Daily Loads (TMDLs) are tied into the new permit. The Stormwater Planning Division and the Maintenance and Stormwater Management Division incorporated into the new permit a more comprehensive stormwater management program. This program includes the comprehensive Watershed Management Planning effort and long term biological monitoring, infrastructure mapping, inspections and maintenance, retrofitting developed areas with water quality control facilities, and more rigorous public outreach and education. The Maintenance and Stormwater Management Division of DPWES will perform inspection of privately owned stormwater management facilities on a regular basis (every five years). Water quality will be monitored at six storm sewer outfalls four times per year (seasonally), and 100 outfalls per year will be monitored during dry weather to determine the presence of illicit discharges.

During 2004, the county continued to evaluate BMPs (best management practices), undertook ten stormwater management ponds, continued with the monitoring of dry weather outfalls, and inspected over 1,600 stormwater control facilities.

The 2004 Annual MS4 Report was submitted by the county and accepted by the Virginia Department of Environmental Quality.

3. Regional Stormwater Management Program

a. Background

Since the early 1980s, the county's *Public Facilities Manual* (PFM) has included a provision that encourages the concept of regional stormwater management. As opportunities arose, major developers as well as county staff pursued regional stormwater management primarily through the development process. An overall plan identifying the most appropriate locations for regional facilities was needed to improve this process.

In January 1989, the Board of Supervisors adopted a plan prepared by the engineering firm of Camp, Dresser and McKee. The plan, intended to be a pilot program, consists of a network of 134 detention facilities that will directly control 35 square miles of drainage area. To date, over 46 regional ponds in the Regional Stormwater Management Plan have been constructed. Currently, there are 28 facilities in various stages of implementation. Eighteen potential facilities are in the final design phase, either as county-managed projects or via developers through rezoning commitments. Five regional pond facilities are currently in the bonding or construction phase.

This Stormwater Management Plan has been reevaluated, and recommendations for change have been made, by the Regional Pond Subcommittee, which is an ad hoc subcommittee of the Fairfax County Environmental Coordinating Committee. The Department of Public Works and Environmental Services is responsible for chairing and the work production of the Subcommittee. The Board of Supervisors tasked this Subcommittee on January 28, 2002 to examine the role of regional ponds as well as other alternative types of stormwater controls as watershed management tools. Public meetings (attended by over 100 people) were held in late 2002, and the report was submitted to, and subsequently accepted by, the Board of Supervisors. The Subcommittee identified 61 recommendations to improve Fairfax County's stormwater management program and to clarify the role of regional ponds in that program. The general consensus is that regional ponds do play a part in the county's stormwater management program, but their size and usage can be reduced by the use of better site designs and low impact development practices. The Subcommittee is currently coordinating the development of an implementation plan for all 61 recommendations, including a timeline and defined agency roles and assignments. This new plan, when implemented, should facilitate the merging of stormwater management goals within the watershed protection and restoration goals and should allow for the use of more innovative low-impact development and stormwater management techniques in Fairfax County.

The Subcommittee is currently suspended after an attempt was made to consolidate the recommendations into broader categories and action plans. A number of the recommendations are being addressed within the watershed management plan development along with efforts to modify the PFM to include Low Impact Development (LID).

c. County Mowing Policy at Stormwater Management Ponds

During the summer of 2000, in support of the interim tree policy adopted by the Board of Supervisors in 1999, the county revised the pond-mowing program. The interim tree policy provides opportunities for planting trees beyond the areas currently allowed under the Public Facilities Manual. The mowing program reduces the area mowed in and around a stormwater management pond by an average of 60% per pond.

d. Stormwater Pond Retrofit to Shallow Marsh Wetlands

The Maintenance and Stormwater Management Division of DPWES has noted the following: In 2004, four stormwater ponds that are maintained by the county, serving a total of 72 drainage acres, were retrofitted with shallow marsh wetlands in the pond floors. To date there are 1,051 dry-ponds in the county and less than 451 provide water pollution treatment. That leaves nearly 600 existing dry ponds which could potentially be retrofitted for pollution treatment. Of the 451 ponds that currently provide water quality treatment, there are a sizeable number that could be modified with new technologies to enhance their treatment capacities. To date, over

55 ponds have been planted. It is estimated that approximately eight to ten additional ponds will be planted this year.

4. Stormwater Treatment Facilities in Fairfax County

Fairfax County has various types of stormwater treatment facilities. Dry ponds are designed to fill up with water during a storm but return to a “dry” state within a few hours or a few days depending on their functional requirements. Wet ponds contain water year-round. The county maintains 1,127 stormwater management facilities, including 995 on-site dry ponds, 38 regional ponds, 47 underground chambers, 33 percolation trenches, five regional wet ponds, six bioretention areas, and two manufactured BMPs. In 2004, the county inspected each facility at least once, mowed 530 dam embankments, and performed 291 maintenance work orders.

There are 2,230 privately maintained facilities in the county: 282 wet ponds; 460 dry ponds; 114 sand filters; 52 manufactured BMPs; 336 percolation trenches; 554 roof top detention areas; 46 parking lot detention areas; 380 underground detention facilities; and six bio-retention areas. These facilities are inspected once every five years. A total of 457 (20%) such facilities were inspected in 2004.

5. Infill and Residential Development Study

The combination of development patterns in the county and a growing concern over water quality issues led to the May, 1999 request from the Board of Supervisors for the “Infill and Residential Development Study.” The study was completed and released to the public in 2000. The Board of Supervisors accepted the final recommendations on January 22, 2001. The Study staff has reviewed the effectiveness of current policies regarding erosion control and storm drainage with the dual goals of minimizing any impacts of stormwater runoff from a proposed development on downstream property and limiting the impacts of stormwater management facilities on a neighborhood. Recommendations include:

- 1) An enhanced erosion and sediment control program, including the revoking of land disturbing permits during egregious violations;
- 2) Allowance of the use of chemical erosion prevention products and bonded fiber matrix on highly sensitive soils or on steep slopes;
- 3) Adoption of innovative BMPs;
- 4) Amendment of the Public Facility Manual to include Super Silt Fence requirements, Storm Drain Inlet Protection Devices, and Faircloth Skimmers;
- 5) Improved requirements for early review of stormwater management facilities as part of the rezoning process;
- 6) Improved requirements for evaluating the adequacy of stream channels for increased runoff due to new developments;
- 7) Development of a BMP monitoring program; and
- 8) Enhanced education programs for citizens, staff, and industry regarding E&S control.

Actions in 2002 to fulfill the recommendations included the following:

- 1) Development of an alternative inspection program has been completed and approved by the Virginia State Soil and Water Conservation Board in December of 2002.
- 2) Changes in improved siltation and erosion control amendments in the PFM now include Super Silt Fences and the start of the approval process for including Faircloth Floating Skimmers.
- 3) A Study concerning the impact of extended detention of the one-year storm was started in January, 2002.

Implementation of the recommendations continues. In 2004 significant progress was made towards the fulfillment of the stormwater and erosion and sedimentation (E&S) control initiatives. It is anticipated that the proposed Adequate Outfall Public Facilities Manual amendments will be finalized in 2005.

F. NONPOINT SOURCE POLLUTION PROGRAMS

1. Chesapeake Bay Program and Agreements

The Chesapeake Bay Program (CBP) is a cooperative arrangement among three states (Virginia, Pennsylvania, and Maryland), the District of Columbia, and the Federal government (represented by the Environmental Protection Agency) for addressing the protection and restoration of the water quality, habitats, and living resources of the Chesapeake Bay and its tributaries. These commitments are not legally binding. Each state determines how it will meet the various commitments, and the approaches to implementation often vary greatly among states. All streams in Fairfax County are tributaries of the Potomac River, which flows into the Chesapeake Bay. Three Chesapeake Bay Agreements have been signed, focusing on reducing pollutants in the Bay and its tributaries.

2. The Virginia Chesapeake Bay Preservation Act and Regulations

The Virginia Chesapeake Bay Preservation Act was passed as part of Virginia's commitment to the second Chesapeake Bay Agreement goals to reduce nonpoint source phosphorus and nitrogen entering the Bay. Pursuant to the requirements of the Chesapeake Bay Preservation Act and Regulations, the Division of Chesapeake Bay Local Assistance (CBLA, formerly the Chesapeake Bay Local Assistance Department, or CBLAD) and the Chesapeake Bay Local Assistance Board (CBLAB) have reviewed Fairfax County's Comprehensive Plan for consistency with the Act and Regulations.

On March 19, 2001 CBLAB determined that Fairfax County's Phase II (Comprehensive Plan) program was consistent with the Chesapeake Bay Preservation

Act and Regulations, subject to the condition that the County undertake and complete recommendations addressing the following:

- The incorporation of the adopted map of Chesapeake Bay Preservation Areas into the Comprehensive Plan;
- The identification of conditions along the County's tidal shoreline as they relate to erosion;
- The development of policies and implementation strategies to assist the County's Wetlands Board in its review of shoreline erosion control proposals;
- The identification of waterfront access points;
- The development of policies to establish criteria for locating boating access sites;
- The identification of water pollution sources;
- The development of policies, where appropriate, to address recommendations from the Infill and Residential Development Study that affect water quality; and
- The development of policies to address redevelopment and water quality improvement.

On November 15, 2004, the Board of Supervisors adopted a Comprehensive Plan amendment that served to satisfy these requirements. The amendment included revisions to text in the Environment section of the Policy Plan as well as the incorporation into the Policy Plan of a Chesapeake Bay Supplement that provided detailed discussions of issues related to the CBLAB requirements. On March 21, 2005, CBLAB determined that the Comprehensive Plan, as amended, is fully consistent with the Chesapeake Bay Preservation Act and Regulations.

On July 7, 2003, the Board of Supervisors adopted a revised Chesapeake Bay Preservation Ordinance in order to comply with amendments to the State's Chesapeake Bay Preservation Area Designation and Management Regulations (see section K of this chapter). Of particular note was the incorporation of changes to the designation criteria for Resource Protection Areas (RPAs) to more directly reference water bodies with perennial flow, resulting in a significant expansion to the county's RPA network. A related effort to map all perennial streams in the county (see section G of this chapter) has been completed, and revised maps of Chesapeake Bay Preservation Areas have been prepared.

The agricultural portion of the Chesapeake Bay Preservation Ordinance requires landowners with land in agricultural uses to have conservation plans. The Northern Virginia Soil and Water Conservation District (NVSWCD) prepares soil and water quality conservation plans and provides technical assistance in the implementation of approved plans. NVSWCD has written plans for all Agricultural and Forestal Districts that have Resource Protection Areas within their limits. Currently, NVSWCD is working extensively with horse owners and keepers, since a large percentage of agricultural land use in Fairfax County is related to horse operations. These operations require innovative land management and careful nutrient management to prevent and reduce pollution in runoff to nearby streams.

In 2004, 13 soil and water quality conservation plans were developed for 1,001 acres; 7,070 linear feet of RPAs were included. Cumulatively, 9,960 acres and 267,161 linear feet of RPAs are covered by water quality conservation plans that have been developed since 1994, when the program began. County regulations require conservation plans for establishing and renewing Agricultural and Forestal Districts. As noted in the Ecological Resources chapter of this report, there are 41 Local and two Statewide Agricultural and Forestal Districts in the county. NVSWCD also develops conservation plans for landowners receiving state cost-share money for installing agricultural BMPs, such as manure storage and composting structures or fencing animals out of streams. NVSWCD continues to distribute a brochure it developed for Fairfax County horse-keepers: *Agricultural Best Management Practices for Horse Operations in Suburban Communities*.

3. Erosion and Sedimentation Control and Enforcement-Fairfax County Department of Public Works and Environmental Services

DPWES is planning the implementation of organizational improvements to the Environmental and Facilities Inspection Division (EFID, formerly the Site Inspection Branch) that will result in a greater emphasis and a higher quality of inspection services associated with erosion and sediment control. DPWES will be developing a new quality assurance program and will be training Field Specialists (a newly established position). Field Specialists will be responsible for resolving all erosion and sediment control violations. DPWES will be developing a prioritized inspection program, in accordance with guidelines established by the Virginia Department of Conservation and Recreation, that will consider slope, soil type, proximity to streams, and extents of buffer areas to determine an overall rating for any given site. These proposed resource requirements and organizational improvements are being led by the county's Environmental Coordinator.

a. Inspections

In 2004, the EFID conducted 33,565 Erosion and Sediment (E&S) control inspections, an increase of 15% from 2003. There were averages of approximately 1,530 major plan projects and 1,920 minor plan projects ongoing at any given time in 2004. Currently, 34 site inspectors perform these Erosion and Sediment Control inspections along with other site inspection duties. In 2004, EFID issued an average of 23.35 Notices of Violation (NOVs) per month for violations of Chapter 104 of the Fairfax County Code.

b. Lake Martin

Litigation against two of the upstream developers for off-site damages associated with land development activities has been completed; the developers have been ordered to pay for restoration activities. The county has engaged the services of a consultant to prepare a plan to remove 6,100 cubic yards of sediment from Lake Martin. Additionally, plans to retrofit two upstream existing stormwater

management ponds to protect stream channels that drain into Lake Martin have been drafted. Revisions to the project site were completed in May, 2004. The design for the dredging project was completed and put out to bid in June, 2005.

c. Virginia Department of Conservation and Recreation (DCR) Division of Soil and Water

i. Program review

The DCR reviewed the Fairfax County Erosion and Sediment Control Program in 2002 and gave an “inconsistent” rating. Currently the program has a rating of “Provisionally Consistent” for the four components: Administration; Plan Review; Inspection; and Enforcement. DCR is currently working with the county doing reviews based on a Corrective Action Agreement to bring the program to “Consistent” Status.

ii. Complaints

DCR has received no complaints regarding construction projects under the jurisdiction of Fairfax County since July 1, 2004.

4. Occoquan Basin Nonpoint Pollution Management Program

The Northern Virginia Regional Commission (NVRC) continued in its role as staff to the Occoquan Basin Nonpoint Pollution Management Program. The program was established in 1982 to provide an institutional framework for maintaining acceptable levels of water quality in the Occoquan Reservoir, one of the two major sources of drinking water for much of Northern Virginia. With the release of the 2000 Census data, staff determined that there were approximately 363,000 people residing in the Occoquan watershed as of the year 2000. This represents a four-fold increase in population from when statistics were first collected in 1977. NVRC has initiated an update to its 1992 Northern Virginia BMP (Best Management Practice) Handbook. The main emphasis will be on the inclusion of previously innovative, but now accepted, techniques such as rain gardens and some non-structural BMP techniques with demonstrated removal efficiencies. NVRC will coordinate with local jurisdictions to seek input and combine the broad array of interests to revise the manual.

a. Modeling

In October, 2001, the Occoquan Policy Board and Technical Advisory Committee approved a fundamental change in the management structure for the Occoquan Model. A standing Modeling Subcommittee has been created to oversee the model development, which will be handled by Occoquan Watershed Monitoring Laboratory. The result will be a state-of-art model that will be able to take quick advantage of advances in modeling technology.

In 2004, NVRC completed Total Maximum Daily Loads (TMDLs) for bacteria in Occoquan subsheds of Licking and Cedar Run; these TMDLs were adopted by the EPA and State Water Control Board.

5. Soil and Water Conservation District Technical Assistance

In calendar year 2004, NVSWCD:

- Continued to review sites plans and provided technical assistance to county agencies and citizens on erosion and sediment controls, water quality protection, nonpoint source pollution reduction, and stormwater management.
- Reviewed and commented to the county's Department of Planning and Zoning (DPZ) on rezoning and special exception applications, with particular attention to the properties of soils, the potential for erosion, the impact on drainage, stormwater management, and the surrounding land uses and environment.
- Provided technical advice to 669 homeowners and homeowners associations, including 248 onsite visits to advise on erosion, drainage, and other environmental problems, and 45 visits to advise on pond management.
- Demonstrated the *Enviroscape* watershed model six times to a total of 145 people, who learned about watersheds and sources and methods for controlling nonpoint source pollution from various land uses.

NVSWCD created and distributes the *Citizens Water Quality Handbook*, a practical guide to water quality, that contains chapters on watersheds, water conservation, nonpoint source pollution, stream management, wetlands protection, water quality monitoring, environmentally friendly lawn care, specific suggestions for "making a difference," and a listing of agencies and organizations that provide services, information, and help related to water quality.

The *Water Quality Stewardship Guide*, contains useful information on watersheds, water quality, and the sources of nonpoint source pollution, and suggests specific actions citizens can take to improve water quality. It is available on line at <http://www.fairfaxcounty.gov/nvswcd/waterqualitybk.htm>.

In 2004, NVSWCD distributed 4,217 brochures and flyers related to the reduction of nonpoint source pollution.

6. Virginia Department of Forestry Technical Assistance

In 2004, the Virginia Department of Forestry (VDOF) assisted Fairfax ReLeaf with the development and installation of a rain garden at Crossfield Elementary School. VDOF worked with NVSWCD and DPWES to plan and install a rain garden at Yorktown Square Condominiums. VDOF also participated in over 20 activities, including rain

garden presentations and workshops and watershed/water quality presentations to students, homeowner associations, garden clubs, and professional groups. VDOF created a new rain garden brochure for citizens and will help bring the concept to more people in Fairfax County.

7. Stream Valley Reforestation

In 2004, the Virginia Department of Forestry partnered with volunteers from various organizations, such as the Difficult Run Community Conservancy, Potomac Conservancy, Trout Unlimited, Eagle Scouts, and the Chesapeake Bay Foundation to plant approximately 2,050 seedlings throughout Fairfax County. VDOF assisted an Eagle Scout with a stormwater management project in the Big Rocky Run watershed, which resulted in erosion reduction and stabilization of a 200-foot drainage swale adjacent to New Braddock Road.

VDOF, FCPA, and DPWES are partnering on a stream buffer restoration project that will replenish areas along streams with deficient riparian vegetation. Areas will be determined based on data from the Stream Physical Assessment Study, which identified deficient buffers along over 800 miles of streams.

8. Stream Bank and other Stabilization Projects

a. Accotink Creek Watershed

In October, 2004, Fairfax County Park Authority, VDOF, Trout Unlimited, Dominion Power, and the Department of Game and Inland Fisheries worked together to restore approximately 1,500 linear feet of stream along Accotink Creek between Wakefield Park and Americana Park using bioengineering techniques.

b. Pohick Creek Watershed

In spring, 2004, VDOT used bioengineering techniques to restore a Pohick Creek tributary near Lorton Road. The project was part of VDOT's U.S. Route 1 widening project and field evaluations indicate the project was successful.

c. Huntley Meadows Park - Barnyard Run

The Fairfax County Park Authority and the Department of Public Works and Environmental Services are working on a bond project that would use bioengineering and conventional stabilization practices to protect the stream reaches of Barnyard Run above Huntley Meadows Park. Barnyard Run and its tributary will be rehabilitated using bioengineering techniques.

d. Difficult Run Watershed

The Fairfax County Park Authority has hired a consulting firm to design a stream restoration project to stabilize several hundred feet along two sections of Difficult Run upstream of Georgetown Pike. Construction for the project is expected to commence in June 2005 with completion slated for fall 2005.

e. Fairfax County Stormwater Planning Division

Fairfax County Stormwater Planning Division (SWPD) uses three options to address stream corridor condition:

1. *Nonintervention and undisturbed recovery* – stream corridor is recovering and active rehabilitation or restoration is unnecessary and/or detrimental.
2. *Partial intervention for assisted recovery* – where spot stabilization of stream banks, soil bioengineering techniques, and minor in-stream modifications to correct flow characteristics within the existing stream course are adequate.
3. *Substantial intervention for managed recovery* – requires significant reconfiguration of the stream channel using natural stream design techniques, which typically results in relocating or adjusting a stream's location, cross section, or profile.

These three options are the result of project scoping that includes an overview of the contributing watershed with potential Low Impact Development or other improvements in mind to address prevailing stormwater problems. SWPD has used these options on more than fifteen stream projects in 2004.

9. Septic System Permitting and Repairs

Improperly built and maintained septic systems can often be a source of pollution to surface and ground waters. Approximately 30,000 homes and business are served by septic tank systems in Fairfax County. The county's Health Department has reported that, in fiscal year 2004, 215 new septic systems were constructed, 831 Septic Tank Repair Permits were issued (repairs ranged from total replacement of the system to minor repairs such as broken piping), and there were 721 Septic System Repair Permit approvals. Areas of marginal or highly variable soil remain a concern for future failing septic systems. The Health Department inspects new septic systems that are installed as well as the repair of malfunctioning systems. Further, the Health Department enforces requirements pertaining to failing septic systems when such systems are identified (either through a neighborhood survey or by citizen complaint). However, staff resources do not allow for routine inspections of operating systems.

During 2004, one Sewer Extension and Improvement project extended sewer to ten homes. It should be noted that this does not mean that all ten homes had malfunctioning septic systems; typically, neighborhoods considered for sewer line extensions have a few failing systems along with conditions that evoke concerns about

the potential for more widespread failure (e.g., ages of septic systems; lack of replacement area in case of failure).

10. Sanitary Sewer Maintenance and Repair

Closed circuit television inspection is used to inspect trunk sewer mains to identify defective lines in need of repair. In 2004, 228 miles of old sewer lines and 35 miles of new sewer lines were inspected. Approximately 139,000 feet of sanitary sewer lines were rehabilitated. Over the past seven years, repairs add up to 197 miles of sewer lines. 32 dig-up repairs and 209 trenchless point repairs were completed.

11. Storm Sewer Maintenance and Repair

In 2004, 169 miles of storm sewer pipe were field verified as to location and inspected for deficiencies and maintenance items. The process resulted in 612 work orders being written to correct deficiencies.

G. PERENNIAL STREAM MAPPING PROJECT

A project to field identify perennial streams was initiated in September, 2001 in response to Fairfax County Board of Supervisors' direction as a result of an Environmental Quality Advisory Council (EQAC) resolution relating to the mapping and protection of additional stream segments under the county's Chesapeake Bay Preservation Ordinance. Funding was approved on September 10, 2001. During the fall, 2001, staff developed a draft protocol for field identifying the boundaries between intermittent and perennial streams. Fieldwork was completed by November, 2003 and serves as the basis for delineating perennial stream segments for Resource Protection Area buffers as required by the Chesapeake Bay Preservation Ordinance. On November 17, 2003, the Board of Supervisors adopted the new maps, thus increasing by 52% the amount of stream miles protected (from 520 to 850 miles).

The Fairfax County Stream Classification Protocol, Field Data Sheets, and interactive maps displaying the county's Chesapeake Bay Preservation Areas are available online at www.fairfaxcounty.gov/watersheds/perennial.htm.

Between May and October, 2004, the Quality Assurance/Quality Control Study of the Perennial Streams Identification and Mapping was conducted. A total of 10% of the streams initially surveyed between 2002 and 2003 were selected for the QA/QC study. The majority of the sites were randomly selected; however, many of the sites were target based on the following criteria:

- Visual inspections of tributaries to determine areas that may be suspect;
- Sites where surveys were not conducted by county staff;

- Field notes from original surveys that indicate particular streams that should be resurveyed in different seasons (wetter or drier); and
- Contentious locations.

The results of the QA/QC Study were presented to the Board of Supervisors in spring, 2005 along with revised Chesapeake Bay Preservation Area Maps.

H. WATERSHED PLANNING AND MANAGEMENT

1. Countywide Watershed Planning

In 2003, the Stormwater Planning Division of the Fairfax County Department of Public Works and Environmental Services commenced a watershed planning program to develop new management plans for all 30 county watersheds. The current master drainage plans were developed for the county in the mid 1970s. Data from the countywide Stream Physical Assessment (completed in 2003) in combination with Stream Protection Strategy Baseline Study and other watershed and stream monitoring information are being used for the development of the watershed management plans.

Little Hunting Creek

The development of comprehensive watershed management plans commenced in 2003 with the Little Hunting Creek Watershed. The final Draft Little Hunting Creek watershed Plan was presented in December, 2003. The County Board of Supervisors approved the final watershed management plan on February 7, 2005. The plan includes a multitude of projects, including stream restoration, riparian buffer restoration, installation of rain barrels, improving existing stormwater management facilities, and recommendations on modifying the County Code and PFM. Approximately nineteen projects are in the design and implementation phase.

Popes Head Creek

The Popes Head Creek Watershed management planning process began in September, 2003. Three public forums were held to discuss and raise awareness about various issues within the watershed, disseminate information about these issues, and review and provide feedback on draft plan versions. The final plan is expected to be presented to the Board of Supervisors in January, 2006. The plan includes various projects such as stream restoration, low impact development, water quality improvements to existing stormwater facilities, road and culvert improvements, and recommended modifications to the County Code and the PFM.

Cameron Run

The Cameron Run Watershed management planning process commenced in 2003. An issue scoping forum was held in June, 2004 to collect information from residents on the

types and locations of watershed problems. A second public forum was conducted in October, 2004 to educate citizens about the condition of the watershed. Fairfax County has entered into an agreement with the Army Corps of Engineers and the city of Alexandria to complete a more comprehensive watershed study that includes portions of Cameron Run outside the county. This will place the county in a favorable position to leverage federal funds in the future for plan implementation. A draft plan is expected to be completed and available to the public in fall, 2005.

Cub Run/Bull Run

The Cub Run/Bull Run Watershed management planning process commenced in 2004. The watershed plan is being developed with guidance from a steering committee comprised of residents representing various groups and interests within the watersheds. One public forum and a watershed tour have been held to identify problems areas and raise awareness about issues facing the watersheds.

Difficult Run

The Difficult Run Watershed management planning process commenced in 2004 with the formation of a steering committee that would guide the planning process. Two public forums have been held to educate residents about watershed basics and the condition of the watershed and to collect information about problem areas and issues. The committee is identifying areas for remediation and is researching solutions such as implementing low impact development techniques throughout the watershed. Since the watershed is so large, the committee decided to break up the watershed into three areas and have separate public forums for those residents living in each area to review and comment on the draft plan. The final plan is slated for completion in spring, 2006.

Pimmit Run and Middle Potomac

The Pimmit Run and Middle Potomac watershed management plan encompasses five separate watersheds: Pimmit Run; Bull Neck Run; Scott's Run; Dead Run; and Turkey Run. The planning process began in 2004 with the formation of a steering committee and a public issue forum that was held to identify key problems within each watershed. The final watershed management plan is anticipated to be completed in spring, 2006.

Other Watersheds

Additional watershed management plans anticipated to be started in 2005 include Accotink Creek, Dogue Creek, Little Rocky Run/Johnny Moore Creek, Pohick Creek, and Sugarland Run/ Horsepen Creek. Accelerating the development of the remaining plans in order to complete all county watershed plans by 2008 is being considered.

2. New Millennium Occoquan Watershed Task Force

In 2002, the Board of Supervisors celebrated the 20th anniversary of the rezoning of nearly 41,000 acres of land in the watershed for the purpose of protecting the Occoquan Reservoir (one of two sources of drinking water for the majority of Fairfax residents) from nonpoint source pollution. Included in this celebration was the establishment of the New Millennium Occoquan Watershed Task Force, which was established by the Board to provide guidance on appropriate watershed management efforts 20 years after the rezoning. The Task Force presented a series of recommendations addressing watershed management issues on January 27, 2003. The recommendations of the Task Force provide an assessment of issues facing the Fairfax County portion of the Occoquan Watershed, examine the gaps in programs being carried out by local, state, and regional agencies, help define the role of volunteer organizations that have interests in the watershed, and provide a vision for the future management of the watershed. On July 7, 2003, county staff presented the Board of Supervisors with an implementation plan responding to each of the 29 recommendations of the report. Implementation of the recommendations is ongoing.

I. GROUND WATER ASSESSMENT

The United States Geological Survey (USGS) maintains a series of wells throughout the nation to monitor groundwater levels and drought. Two are located in Virginia; one such well (Site 385638077220101) in Fairfax County has been maintained since 1976. This well provides continuous real-time data that is used by the USGS to assess ground water levels. You can find the information on this well by going to <http://groundwaterwatch.usgs.gov>.

Neither Fairfax County nor the Virginia Department of Environmental Quality monitors for groundwater levels or groundwater water quality data.

J. DRINKING WATER SUPPLY

The county's water supply comes from the Potomac River, the Occoquan Reservoir, Goose Creek, community wells, and private wells. Fairfax Water (FW), formerly known as the Fairfax County Water Authority (FCWA), provides drinking water to most Fairfax County residents. FW also provides drinking water to the Prince William County Service Authority, Loudoun County Sanitation Authority, Virginia America Water Company (City of Alexandria and Dale City), Town of Herndon, Fort Belvoir, and Dulles Airport. However the City of Fairfax receives its water from the Goose Creek Reservoir in Loudoun County, and the City of Falls Church buys its drinking water from the Washington Aqueduct's Dalecarlia Plant on the Potomac River. Much of the information provided in this section of the Annual Report has been excerpted from guidance provided by Fairfax Water.

With the exception of some wells, prior to use the water must be treated. Fairfax Water provided 50.634 billion gallons of drinking water in 2004.

Table III-3 Fairfax Water -Water Supply Sources, 2004	
<u>Sources</u>	<u>Gallons (in billions)</u>
Occoquan Reservoir (Lorton/Occoquan)	20.18
Potomac (Corbalis)	30.32
Wells	0.006
Purchased	0.02
Untreated	0.108
TOTAL	50.634

Source: Fairfax Water

1. Wells

a. Fairfax Water and Public Wells

In 2004, FW operated two wells in Fairfax County, both located in the Riverside Manor Community. These two wells and their distribution systems were monitored monthly for bacteriological quality and annually for Volatile Organic Compounds (VOCs). In addition, the wells were tested semiannually for metals, nutrients, solids, odors, color, pH, alkalinity, and turbidity. In 2004, the monitoring results for both wells and distribution system met the current requirements of the Virginia Department of Health Waterworks Regulations.

Lead and copper monitoring in accordance with EPA and Virginia Department of Health (VDH) Waterworks Regulations was performed on the distribution system in 2004. The system met all EPA Lead and Copper regulatory requirements and continued on an Ultimate Reduced Monitoring schedule by VDH due to the low levels found. The next scheduled collection is during 2005.

Tests of FW Riverside Manor Well system indicate the presence of radon in the water. Radon is naturally occurring substance and it is not unusual to be present in groundwater resources in Fairfax County. Health effects from radon exposure have found to be far greater from indoor air as opposed to water. For this reason, the Fairfax County Health Department advises residents who may be concerned about radon in their homes to test the indoor air levels. Radon is not currently regulated in public drinking water systems. FW removed the Riverside Manor Subdivision water system from ground water service in 2005, thus effectively eliminating drinking water-borne radon contamination.

b. Private Wells

There are approximately 12,000 single family residences that are served by individual well water supplies in Fairfax County. In 2004, 144 New Well Permits were issued for single family residences. There were 265 wells closed in 2004.

2. Lorton and Corbalis Systems Monitoring Results and Reports

a. Trihalomethanes, Chloramines, and other By-products of Water Treatment

Trihalomethanes are by-products of chlorination water treatment and are thought to be carcinogenic.

b. Trihalomethanes (THM) Monitoring Project

The 2004 distribution system running quarterly averages were below the Maximum Contaminant Levels (MCL) for total trihalomethanes (TTHM) of 80 µg/l. The 2004 running quarterly averages for TTHMs were 18 µg/l and 34µg/l for the Corbalis and Lorton distribution systems, respectively.

c. Disinfectant/Disinfection By-products (D/DB-P) Rule

EPA has promulgated Stage I of the D/DB-P Rule, which lowers the total THM MCL from 100 µg/l to 80 µg/l. This rule took effect in January, 2002 (TTHM - Total Haloacetic Acids, Bromate, and Chlorite and the Disinfectants, Chlorine, Chloramine, and Chlorine Dioxide).

In addition, the disinfection by-product “Haloacetic Acid 5” (HAA5) will be regulated at a level of 60 µg/l. The 2004 HAA5 distribution system running quarterly averages were below the Maximum Contaminant Level (MCL) of 60 µg/l. The 2004 running quarterly averages for HAA5s, as reported to the Virginia Department of Health, were 19 µg/l and 37 µg/l for the Corbalis and Lorton distribution systems, respectively.

The rule also sets a Maximum Residual Disinfectant Level (MRDL) for chlorine of 4 µg/l in drinking water. The MRDL for chlorine was 3.2 mg/l in 2004.

d. Heavy Metals

FW tests drinking water quarterly for Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Copper, Lead, Magnesium, Mercury, Nickel, Potassium, Selenium, Silver, Thallium, and Zinc and on a monthly basis for Iron, Manganese, and Sodium. The levels of these metals monitored in 2004 continue to be below their MCL or Secondary MCL (SMCL). “The concentration levels for the unregulated metals were within an expected range.” The report is available for review on the web at www.fairfaxwater.org.

e. Enhanced Surface Water Treatment Rule (ESWTR)

The ESWTR assumes revisions to the current Surface Water Treatment Rule may be necessary to provide additional protection from pathogenic organisms. The first step toward developing the ESWTR was the microbiological monitoring required under the Information Collection Rule. The first year of the data has been used to develop requirements for the interim ESWTR. The long-term ESWTR will be based on additional data collection and refinement. The proposed ESWTR will provide for a sanitary survey of the entire system, a maximum contaminant level goal for cryptosporidium of zero, and treatment requirement alternatives. Possible additional requirements may include notifying the state as soon as possible about persistent turbidity levels above the performance standards that might not necessarily be violations.

f. Other Monitoring Programs

Fairfax Water monitored 3,307 distribution taps for total coliform bacteria in 2004. Each month's compliance report was within the regulatory limits for the EPA's Total Coliform Rule.

During 2004, FW monitored surface source waters and finished drinking water for 42 volatile organic compounds (VOC) and 39 synthetic organic compounds (SOC). Finished water is collected at the point of discharge from water treatment plants to the distribution system. No VOCs were detected in the source waters except for trace amounts of MtBe (Methyl tertiary butyl ether), a non-regulated parameter. MtBE is a gasoline additive that has received public attention recently. In some parts of the U.S., MtBE has been detectable in high amounts in source waters. The only VOCs detected in the finished water systems were TTHMs and trace amounts of MtBE. The few SOC's that were detected in the finished and source waters were at trace levels significantly below the Maximum Contaminant Levels (MCL). Specific information can be found in the FW Annual Report on Water Quality for 2004, available on line at www.fairfaxwater.org.

During 2002, FW monitored 53 customer taps for lead and copper in accordance with the EPA regulations. FCWA met all EPA and VDH requirements for this rule and has been put on Ultimate Reduced Monitoring status due the prolonged low results. The next scheduled monitoring will be in the summer of 2005.

g. Residuals Disposal

Residuals occur as the result of heavy sediment loads entering the freshwater intakes and having to be removed from the water prior to treatment. "Maryland and Virginia farmers consider the high calcium carbonate content of the dewatered residuals to be beneficial soil additives." Residuals generated at Corbalis continue to be applied by contract to agricultural lands in Maryland and Virginia. FW is studying the possible use of polymers in lieu of lime in the dewatering process. If

polymer condition dewatering becomes feasible, the solids volume for disposal may decrease. FW is expecting to begin design of new dewatering equipment some time in 2006.

h. Consumer Confidence Reports

Federal regulations require water suppliers to provide annual reports on the quality of the drinking water to their customers through the Consumer Confidence Report (CCR) Rule. FW customers received their first annual CCR in the summer of 1999. The 2004 Water Quality Report is available for review on the FW Web site at <http://www.fairfaxwater.org>.

3. Source Water Assessments

The 1996 Amendments to the Safe Drinking Water Act (SDWA) provided for source water assessment and protection programs designed to build a prevention barrier to drinking water contamination. Under SDWA, states are required to develop comprehensive Source Water Assessment Programs that identify the areas that supply public tap water, inventory contaminants, and assess water system susceptibility to contamination. Fairfax Water, through a grant from the Virginia Department of Health, has completed an inventory of potential sources of contamination and a survey of land use activities within the Potomac and Occoquan Watersheds. The Virginia Department of Health is currently reviewing the complete Source Water Assessment. This is available for review on the FW website at <http://www.fairfaxwater.org>.

4. Facilities Management

a. New Occoquan Water Treatment Plant (Griffith WWTP)

FW is nearing completion of the new Griffith Water Treatment Plant, a 120 mgd (million gallons per day) facility, expandable to 160 mgd, to replace the existing Lorton and Occoquan treatment plants in Lorton. In addition to flocculation and sedimentation, the Griffith Water Treatment Plant will include advanced treatment processes of ozone disinfection and biologically active, deep bed, GAC (granular activated carbon) filtration. Construction of the plant began in spring, 2000 and was approximately 90% completed as of July, 2004. Full use of the plant is currently scheduled for fall, 2005. The raw water pumping station associated with the new plant is completed and has a capacity of 120 mgd, expandable to 160 mgd.

b. Potomac Water Treatment Plant (Corbalis)

This plant located near Herndon, Virginia is currently treating up to 150 million gallons a day taken from an offshore intake on the bottom of the Potomac River. The third 75 mgd phase, which will bring the plant capacity up to 225 mgd, is currently under construction and scheduled to be in service in 2008. The plant is designed for an ultimate capacity of 300 mgd. This utilizes ozone as a primary

disinfectant, flocculation-sedimentation, biologically active filters with carbon caps, and chloramine final disinfection.

5. Regional Cooperative Water Supply Agreements

In order to protect the ecosystem of the Potomac River during low flow periods, the three major water utilities in the Metropolitan Washington area have signed water allocation agreements for water use during these low flow periods. Two upstream dams, Jennings-Randolph on the Potomac River and the Savage River Dam, along with Seneca Lake in Montgomery County, Maryland, are storage facilities for drinking water supplies during low flow periods. While the Potomac River has flows that average above 7,000 million gallons a day, the river has often reached flows well below that, usually in late summer and early fall. The lowest recorded flow in this region was 388 mgd at Little Falls in September during the drought of 1966. This is an adjusted figure that does include the withdrawal allocation of 290 mgd. In 1981, the three major metropolitan water utilities, including Fairfax Water, signed the Low Flow Allocation Agreement, which creates a protocol for allocation of water from the Potomac during periods of low water. The current environmental flow recommendations are 300 mgd downstream of Great Falls and 100 mgd downstream of Little Falls. In 2002, the Maryland Department of Natural Resources revisited this issue of the flow level necessary to support aquatic habitat in the Potomac River and was unable to replicate the methodology used to create the present low flow requirements in the agreement. Droughts that occurred in 1999 and 2002 called attention to the concern that these flows, derived by the 1981 study which was conducted during a period without extreme low flows, needed to be revisited in light of new scientific methods and low-flow information. Responding to these concerns, in 1999 the Maryland Department of Natural Resources (MD DNR) formed a Potomac Flow-by Committee involving resource agencies, environmental organizations, water utility representatives, and other parties to provide guidance for re-evaluation. During the drought of 2002, MD DNR's Power Plant Citing Program assembled teams of biologists from their staff and Versar, Inc, with assistance from Montgomery County, Maryland, and the Interstate Commission on the Potomac River Basin, which performed habitat assessments during that year's low flow conditions.

On April 8, 2003, the Maryland Power Plant Research Program and the Interstate Commission on the Potomac River Basin sponsored a one-day workshop with a panel of nationally recognized experts on habitat assessment to investigate and develop methods to evaluate the environmental flow-by requirements. Their conclusion of the present low-flow agreement is that: "Existing biological data and understanding are inadequate to support a specific, quantitative environmental flow-by." At this workshop, members of the special panel collectively considered and debated the various methodologies applicable to the Potomac River to address the flow-by issue. The final product of the workshop is a set of recommendations for 1) the best method or approach, given current financial resource limitations, to address the Potomac Flow-by Study objectives, and the level of confidence associated with their recommendations, and 2) an alternative long-term method or approach which could

better accomplish those objectives, yet might exceed current resources or available data, and recommended guidelines for achieving the objectives in a longer time-frame.

In September 2003, MD DNR's Power Plant Siting Program issued a report entitled "Habitat Assessment of the Potomac River From Little Falls to Seneca Pool" (Final Document #PPAD-03-1), which provided substantial background information describing the history of current low-flow requirements, a review of the studies conducted to support those requirements, and a report on habitat assessment conducted during low-flow conditions in 2002. The assessment included development of a habitat map, a field survey of habitat types, and measurements of hydraulic and water quality conditions, spanning the period of July through October 2002 when flows were as low as 151 million gallons per day at the gage at Little Falls Dam.

In November 2004, ICPRB convened an update meeting to discuss recent developments in USGS mussel studies and further defining desired hydrological regimes. The next step will be a workshop with regional and national aquatic biologists to develop targeted species and guilds for re-evaluating ranges of tolerance during low-flow events in the study area.

Full reports on these activities can be viewed at:
<http://www.esm.versar.com/pprp/potomac/default.htm>.

In February, 2004, FW adopted the Occoquan Reservoir Shoreline Easement Policy, which places limits on what may be done within FW's easement surrounding the reservoir. The policy prohibits construction of any structures other than piers and floats. Removal of any vegetation, storage of fuels or chemicals, application of pesticides, and placement of debris are also prohibited in this area. The policy is intended to protect the reservoir's riparian buffer.

In June, 2005, the State Water Control Board adopted the Water Supply Planning Regulation (9 VAC 25-780). This regulation requires all cities and counties in the Commonwealth to submit water supply plans to the Virginia Department of Environmental Quality (DEQ). Each water supply plan must include a description of existing water resources and water use, projected demands, a description of water management actions/conservation measures, segment of need for future supplies and alternative analysis, and local government resolution approving the plan. DEQ is revising the Virginia Water Protection Permit regulation to incorporate various elements of the water planning process as they relate to permitting of withdrawals.

a. Interstate Commission on the Potomac River Basin (ICPRB) Cooperative Water Supply Operations (CO-OP)

The ICPRB plays several important roles in providing for the region's current and future water supply needs. The CO-OP Section facilitates the agreement among the three major water utilities (Fairfax Water is one) that require water suppliers to coordinate resources during times of low flows in the Potomac River. The Water

Resources Section also provides technical water resources management assistance to the jurisdictions throughout the basin. Flow in the Potomac River was more than adequate to meet drinking water withdrawal needs by the region's major utilities in 2004. There were no releases from upstream reservoirs necessary to augment water supplies. The ICPRB annually coordinates a weeklong drought management exercise that simulates water management operations and decision making under drought conditions for the Metropolitan Washington area water supplies. Annual simulation allows for renewal of coordination procedures with the water suppliers and other agencies, an opportunity for public education and outreach, and review and improvement of operational tools and procedures. The 2004 report can be viewed at http://www.potomacriver.org/info_center/publications.htm#2005

b. Metropolitan Washington Area Council of Governments (COG) Water Supply and Drought Awareness Plan

In response to the droughts of 1998 and 1999, COG brought together a task force in May, 2000 to coordinate regional responses during droughts to reduced availability of drinking water supplies. The plan consists of two components: (1) a year round plan emphasizing wise water use and conservation; and (2) a water supply and drought awareness and response plan. The Interstate Commission on the Potomac River Basin handles the administration of the coordinated drought response for water withdrawals from the Potomac River and during low flows. Additionally, the CO-OP Section works with COG and the Drought Coordination Committee to assist in providing accurate and timely information to basin residents during low-flow conditions in the Potomac River. In process is a campaign targeted to specific audiences to reduce water use based on the Arizona Water Use It Wisely campaign. Based on a poll conducted in February 2002 for COG, many respondents did not have a basic knowledge of the water supply system. Those most likely to practice water conservation were women over 45. Those least likely to conserve water were males 18 to 24, non-bill payers, lower income residents, and renters in Washington, D.C.

K. NEW LAWS OR REGULATIONS

1. Amendments to the Chesapeake Bay Regulations

December 10, 2002, the Chesapeake Bay Local Assistance Board (CBLAB) adopted its final amendments to the Chesapeake Bay Preservation Area Designation and Management Regulations. These amendments include a revised method to assign Resource Protection Areas (RPAs) to perennial streams. Fairfax County had until December, 2003 to submit its revised Chesapeake Bay Preservation Ordinance to CBLAB. As noted earlier in this chapter, the Board of Supervisors adopted a revised Ordinance on July 7, 2003 and accepted the revised perennial stream maps as a basis for implementation in November, 2003. CBLAB has determined that the county's

revised Ordinance is consistent with the Chesapeake Bay Preservation Act and Chesapeake Bay Preservation Area Designation and Management Regulations.

2. New Stormwater Legislation HB1177

This legislation, signed on April 8, 2004 by Governor Warner, encourages jurisdictions to adopt stormwater management ordinances that use the concept of Low Impact Development (LID) to the maximum extent practicable. The legislation also transferred the stormwater permitting authority from DEQ to DCR effective in January, 2005. Additionally, the legislation allows the state to transfer the administration of the Erosion and Sedimentation (E&S) permitting for land disturbing activities to jurisdictions, allows these jurisdictions to charge permitting fees for review, and establishes that jurisdictions must transmit 30% of these fees to the state. The target date for the transfer of the permitting program to jurisdictions is set for July 1, 2006; however, this is subject to approval by the US EPA.

L. AWARDS

Fairfax County received recognition by the Chesapeake Bay Program as a Gold Award recipient for the second time since 1997 under the Chesapeake Bay Partner Community program. “The Chesapeake Bay Partner Community Award recognizes, encourages and supports local government in the Chesapeake Bay watershed whose actions demonstrate their commitments to protecting and restoring the Chesapeake Bay, its rivers and its streams.”

The National Association of Counties presented Fairfax County with a 2004 Achievement Award for the county’s innovative Watershed Management Program.

M. OVERVIEW

2004 was another significant year for watershed protection in Fairfax County.

-Adoption of the *Comprehensive Vision for Fairfax Environment* in June 2004. This plan includes: 1) conservation of our limited natural resources must be interwoven into all governmental decisions and 2) the Board must be committed to provide the necessary resources to protect our environment. Of particular interest, the Water Quality section states the following: protect those streams whose waters are still of relatively high quality from becoming impaired with pollutants; consider watershed protection when reviewing and deciding all land use actions; implement new watershed management plans and stream protection strategies; pursue a dedicated source of funding; allow and encourage better site design practices that protect our streams; ensure strict enforcement of erosion and sediment control laws; encourage use of vegetative buffers; and stabilize streams using sound scientific principles that mimic natural systems. The Environmental Stewardship section

states the following: encourage organizations involved in stream monitoring and stream valley restoration to involve schools and citizens of all ages.

-The new Chesapeake Bay Preservation Ordinance, passed in 2003, increased protection to all perennial streams by changing the criteria for designation of Resource Protection Areas. Civil and criminal penalties are available to address violations. Based on DPWES work finished in 2003, the Board of Supervisors adopted the new maps as the basis for administration of the Chesapeake Bay Preservation Ordinance on November 17, 2003, thus increasing by 52% the amount of stream and shoreline miles protected from 638 to 968 miles (including 118 miles of shoreline). DPWES conducted the Quality Assurance/Quality Control study of perennial stream mapping between May and October, 2004. A total of ten percent of the streams initially surveyed were selected for QA/QC process. The results of the QA/QC Study along with the revised RPA maps were presented to the Board of Supervisors in spring, 2005.

-The County is in the process of completing Watershed Management Plans for each of the county's 30 watersheds; the Little Hunting Creek Watershed Plan was the first watershed plan to be completed and was approved on Feb 7, 2005. Watershed management planning efforts were initiated for Popes Head Creek and Cameron Run watersheds in 2003. The Cub Run/Bull Run, Difficult Run, Pimmit Run, and Middle Potomac (Bull Beck Run, Scott's Run, Dead Run, and Turkey Run) watersheds had their planning processes begin in 2004. It is anticipated that this countywide watershed planning effort will be completed in 2008. These plans will serve as guidance for all stream restoration and protection efforts in the county. Implementation of these plans is estimated to occur over the next twenty-five years.

-The New Millennium Occoquan Watershed Task Force was established as part of the 2002 Board of Supervisors' celebrations of the 20th Anniversary of the rezoning of nearly 41,000 acres of land in the Occoquan Watershed. On July 23, 2003, county staff presented the BOS with an implementation plan responding to each of the 29 recommendations of the report, which are in the process of being implemented. An updated status report was presented in 2004.

-In 2004, the Environmental Coordinating Committee's Regional Pond Subcommittee developed a draft implementation plan for stormwater management to address the previously identified 61 recommendations targeted at improving Fairfax County's stormwater management program and to clarifying the role of regional ponds within that program. The recommendations address the use of regional ponds, suggest the inclusion of other innovative and non-structural techniques, and suggest changes in the Public Facilities Manual, stormwater policies, codes and ordinances.

-Much of the local work of monitoring the streams in Fairfax County is now being coordinated in the Stormwater Planning Division of the Department of Public Works and Environmental Services (DPWES); beginning in 2004, the Stormwater Planning Division assumed responsibility for the annual Stream Water Quality Report that was previously

prepared by the Health Department. The 2004 Comprehensive Stream monitoring report will be released in fall, 2005.

-Implementation of the Infill and Residential Development Study Report, accepted by the Board of Supervisors in January, 2001, which had 29 separate recommendations addressing stormwater, erosion and sediment control issues continues.

In addition the following two actions continue to have significant impacts on environmental and watershed stewardship in the county:

-The reformation of the Environmental Coordinating Committee under the Deputy County Executive and the work and guidance of the Environmental Coordinator have done much to coordinate environmental planning within the county.

-In September 2002, the Board of Supervisors adopted an amendment to the Policy Plan volume of the Comprehensive Plan to revise criteria that are used to evaluate residential development proposals. This amendment includes a heightened emphasis on environmental protection, including stormwater management. *Developments should minimize off-site impacts on water quality by commitments to state of the art best management practices for stormwater management and low-impact site design techniques The volume and velocity of stormwater runoff from new development should be managed in order to avoid impacts on downstream properties. Where drainage is a particular concern, the applicant should demonstrate that off-site drainage impacts will be mitigated and that stormwater management facilities are designed and sized appropriately. Adequate drainage outfall should be verified and the location of drainage outfall (onsite or offsite) should be shown on development plans.*

However, Fairfax County streams and watersheds continue to be impacted by four basic problems:

-Stormwater runoff and erosion continue to be the largest problems within Fairfax County streams. **A key requirement for controlling stormwater discharge is to limit post development runoff to that which does not exceed pre-development runoff rates.** The notion of “adequate outfall” theoretically exists but does not seem to exist in real time. Most Fairfax County streams have increased runoff flows that exceed the capacity of their stream channels. This has created an ongoing erosion cycle that includes eroding stream banks, heavy sediment loads, and sedimented stream bottoms. Recent research has shown that over 60% of the sediments in damaged streams are the direct result of stream bank erosion. Streams can become damaged by the changes brought about by changes in stream hydrology and increased flow during the pre-development clearing phase. The stream sees an overall increased flow due to the increased runoff caused by the clearing. This is not just the increase in peak flow, but the increase in the total volume of the water entering the stream. These increased flows start the cycle of damage, and once the stream is damaged it may take years or decades for the stream banks to revegetate and restabilize. This has resulted in erosion problems throughout the county on trail systems, homeowners’ backyards, business’ landscapes, and transportation infrastructure such as bridge

abutments. Sediment on stream bottoms results in reduced habitat and diversity, and compromises food webs within watersheds.

Sediment also compromises the quality of, and increases the expense of, treating the drinking water within the Occoquan Reservoir. Poor land use planning, inadequate enforcement of soil and erosion laws, and inadequate stormwater management in past years has significantly contributed to these erosion problems. Prevention of such damage would not only be good for the environment but would also be cost effective. Prevention of this damage can be assisted by strict monitoring and enforcement of the stormwater management control system prior to construction and not allowing predevelopment runoff flows to increase during the development phase. Only a few streams, such as Walney Creek in E. C. Lawrence Park, remain undisturbed and excellent examples of healthy streams in Fairfax County.

--In addition to problems created in streams, these ongoing erosion patterns have resulted in numerous small ponds and lakes having enormous sediment deposition, which requires frequent maintenance and dredging to maintain pond depth. All ponds fill in over time with sediment and organic material. Depending on the size of the surrounding drainage area, the land uses in that area, and the volume of runoff, a pond can fill up with sediment, trash, and organic debris in a relatively short period of time. Stormwater management ponds are designed to significantly protect downstream water quality. In urban areas, these ponds often provide additional amenities including recreation (boating, fishing), aesthetics, and wildlife habitat. Although dredging is a necessary management component to remove accumulated materials, we have exacerbated the problem because increased impervious surface, in addition to lack of on-site detention for developments, have significantly impacted these facilities. The county maintains many of the stormwater management ponds; however homeowners' associations and other private pond owners also have ponds with sediment problems. This is an issue given the significant dredging expense and lack of local, adequate disposal areas.

-Secondly, at times, high levels of fecal coliform bacteria, particularly E. coli bacteria, occur in specific streams throughout the county.

-Thirdly, progress has been made in this area with the addition of language to the Policy Plan section of the county's Comprehensive Plan; watershed and stream protection, however, need to be maximized in land use planning and site design decisions; the cumulative effects of land use decisions on Fairfax County's streams need to be effectively considered.

-Lastly, although much of the responsibility for stream protection and restoration efforts have been coordinated within DPWES, conflicting results have occurred as stormwater management strategies and policies suggested within one area of DPWES have conflicted with waivers granted by others, often resulting in degraded stream habitat.

Much credit needs to be given to Fairfax County for pursuing its efforts in comprehensive watershed management, including stream restoration and protection and adequate

monitoring of water resources. All of these efforts indicate a significant change in county policy and practice towards the protection and restoration of county streams. However, as long as the rate of stream degradation surpasses stream protection and restoration efforts in Fairfax County streams, the trend will continue to be a downward one.

N. RECOMMENDATIONS

1. We commend the Board of Supervisors for its actions this spring (2005) authorizing one penny of the real estate tax to be dedicated to the stormwater management program. The amount for this coming fiscal year will be an additional \$17.9 million dollars. This is a significant contribution to implementing the recommendations outlined in the county's comprehensive watershed management plans, including retrofitting and rehabilitating existing and aging stormwater management facilities and infrastructure.

However, since this commitment will require reauthorization every year, EQAC continues to encourage the creation of a more stable funding source for watershed improvement.

2. EQAC is pleased that Fairfax County is investigating and reexamining the current definitions and requirements pertaining to adequate outfall. However, EQAC cannot over emphasize the importance and need for increased monitoring of predevelopment stormwater management controls and taking enforcement action to ensure inadequate controls are corrected prior to construction and if necessary during construction. It is also important that the county hire the appropriate number of staff to handle the estimated inspection workload. We are also pleased that staff is in the process of creating regulations that will enforce the PFM requirements for detention during the development phase. This is another enforcement tool that will protect streams during the construction phase. We recommend that the Board of Supervisors approve both of these initiatives.
3. EQAC strongly recommends that Fairfax County (the Board of Supervisors, the Planning Commission, the Board of Zoning Appeals, the Fairfax County Park Authority and various county agencies) continue to coordinate efforts and develop a protocol for assessing the impacts and cumulative effects of land use considerations and decisions on the county's water resources. EQAC urges them to use and disseminate this information to protect the county's watersheds. EQAC commends the Board for adopting Residential Development Criteria that include supporting the provision of adequate drainage outfalls and innovative water quality measures.
4. EQAC commends county staff for investigating and evaluating LID and innovative BMP techniques for inclusion in the PFM. EQAC recommends that the county continue to encourage innovative practices that incorporate bioretention and recharge to aquatic systems. EQAC recommends that appropriate DPWES, DPZ, and LDS staff members are educated on reviewing designs and inspecting projects that incorporate these new techniques. Additionally, EQAC recommends that staff coordinate efforts on developing a process through which these plans are assessed in a timely manner.

5. EQAC continues to support the full funding and implementation of the comprehensive countywide watershed management program. EQAC strongly endorses the ongoing work of county staff with their watershed planning and public outreach efforts and comprehensive stream monitoring program.

EQAC continues to support:

- a) Continued assessments of watersheds, including identification of point and nonpoint sources, levels of erosion, riparian buffer coverage, percentage of impervious surface, and vegetative cover;
 - b) Equal importance should be devoted to environmental protection, restoration, and monitoring as compared to infrastructure improvement and maintenance;
 - c) Maintenance and inspection of county BMPs at the highest level;
 - d) Development of a stream protection and restoration program that has adequate sustainable funding;
 - e) The coordination of all relevant water quality and stream data and data analysis from all sources including the Stream Protection Strategy Baseline Study, Physical Stream Assessment Study, Comprehensive Stream Monitoring Program, and watershed planning program; and
 - f) Granting a minimum number of waivers and reducing the granting authority to a single department so that all waivers must be reviewed and either accepted or denied by the stormwater management program responsible for watershed planning (i.e., the Stormwater Planning Division of DPWES).
6. EQAC continues to recommend posting of health warnings for county streams with high fecal coliform and E. coli bacteria levels until an investigation is conducted and the source of the contamination is identified and remediated. EQAC recommends that these investigations are carried out and remediation plans be implemented whenever there are actual threats to public health. Because county streams continue to have high bacteria coliform counts, EQAC recommends developing a public information campaign and sign posting program that contains the following language from the 1999 Health Department report: *“The use of streams for contact recreational purposes, such as swimming, wading, etc. which could cause the ingestion of stream water or possible contamination of an open wound by stream water, should be avoided.”*
 7. EQAC is pleased to note the MS4 requirement to develop a long-term watershed monitoring program to verify the effectiveness and adequacy of stormwater management goals and identify areas of water quality improvement or degradations. EQAC further recommends a monitoring program to evaluate the effectiveness of stormwater detention facilities. While EQAC understands that a comprehensive countywide program to monitor effectiveness would be cost-prohibitive, data are still needed, as it is still unclear

as to which structures and requirements are effective and working well. At a minimum, monitoring a representative sampling of different types of stormwater facilities throughout the county is recommended.

8. As the need for dredging of stormwater management ponds continues to increase due to impacts associated with increased impervious surfaces in addition to lack of on-site detention for developments, pond owners will need assistance to carry out this necessary maintenance. The county maintains many of the stormwater management ponds; however homeowners' associations (HOAs) and other private pond owners also have ponds with sediment problems. It is becoming more difficult to dredge and remove excess materials from ponds as a result of rising expenses, the increasing need to dredge more frequently due to increased sediment loading, and lack of local, adequate disposal areas. Developing partnerships between Fairfax County, the Park Authority, HOAs and private pond owners and creating spoil disposal/recycling areas in various parts of the county should be considered, especially since these efforts culminate in improving the county's water resources. Dredge material could be recycled and/or used to renovate athletic fields, thereby reducing maintenance costs. As dredging needs continue to increase, it seems necessary and beneficial to explore options. The county could consider the possibility of this being a revenue-generating operation.
9. EQAC commends the county for its existing stream protection requirements for perennial streams, which increased from over 600 miles to over 900 miles as a result of the perennial stream mapping program. EQAC further encourages the Board of Supervisors to support future protective measures for intermittent and headwater streams such as the establishment of protective buffers on either side of a stream.

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ANNUAL REPORT ON THE ENVIRONMENT

CHAPTER IV

SOLID WASTE

IV. SOLID WASTE MANAGEMENT

All materials in this chapter were supplied by the Division of Solid Waste Collection and Recycling and the Division of Solid Waste Disposal and Resource Recovery, both within the Fairfax County Department of Public Works and Environmental Services (DPWES). EQAC thanks DPWES for its contributions to this report.

A. ISSUES AND OVERVIEW

Fairfax County's Solid Waste Management Program (SWMP) had another safe and productive year in FY 2005. As projected, the county exceeded its obligations to Covanta Fairfax, the owner of the I-95 Energy Resource Recovery Facility (E/RRF) as well as collecting waste from over 43,000 homes in County Sanitary Districts with few complaints. The program consolidated waste at the I-66 Transfer Station and moved, on average, 140 tractor trailer loads daily to the E/RRF or other disposal locations. Recycling in the county averaged 32% for all solid waste generated, exceeding the state requirement of 25%. This year was spent working to implement the Solid Waste Management (SWM) Plan. The plan was approved by the Virginia Department of Environmental Quality (VDEQ) in 2004 and will serve as the roadmap for the next 20 years of integrated solid waste management in the county.

Solid Waste Task Force. As part of the approval of the SWM Plan by the Board of Supervisors, the Board appointed a citizens task force to investigate customer service, operations, environmental, and other issues identified by the Board and residents. A member of EQAC served on the task force, bringing a strong environmental perspective to the findings and recommendations of the task force. The concise report contained 31 major recommendations, 11 pertaining to environmental issues specifically. The full text and list of report recommendations can be viewed on the county's Web site at www.fairfaxcounty.gov/dpwes/swtf/finalreport/rptcontent.htm.

Environmental Excellence. The SWMP continued its certification as an Environmental Enterprise (E2) program in Virginia. One of the major requirements of the E2 designation is having a management system with environmental policies and procedures. The organization must also identify environmental goals and objectives and define how the organization will achieve and maintain those goals. To date, the SWMP has met all its targets and goals.

B4B. In another environmental initiative, the SWMP became a founding member of the Businesses for the Bay (B4B). B4B is a voluntary team of forward-looking businesses, industries, government facilities and other organizations within the Chesapeake Bay watershed that are committed to implementing pollution prevention measures in their daily operations to reduce chemical contamination and other waste releases into the bay.

Celebrate Fairfax. The program received recognition as the Best of Show ribbon winner during Celebrate Fairfax in June 2005, for its innovative "home party" demonstrating

recycling, waste reduction, household hazardous waste, and disposal strategies for its guests. The house also displayed the new Ford Hybrid Escape and an electric car that are used at county disposal facilities. The party, hosted by the Recycling Guys, was also a favorite with the guests because they learned how all facets of the recycling and disposal programs in the county integrate into one program to handle waste generated in the county in an environmentally responsible manner.

Credit cards have proven to be a real success with customers at the citizens' disposal facilities at I-66 and I-95 locations. Begun in FY 2004 as a pilot program, this customer service initiative accounted for over \$584,008 in sales this year. Along with the new version of weighing software being fully deployed, the use of the credit card system was implemented seamlessly for commercial cash customers and residents.

The two solid waste divisions within the county government, the Division of Solid Waste Collection and Recycling (DSWC&R) and the Division of Solid Waste Disposal and Resource Recovery (DSWDRR) continued or expanded their programs and activities within the sanitary districts and at the I-66 and I-95 disposal locations. An updated strategic plan was completed, identifying goals, actions, performance measures, and outcomes for the program through 2010. These goals are reflective of the County's Framework for Excellence and also provide the basis for the SWMP's county budget. The goals tied to Framework for Excellence elements are:

- ***Maintain And Enhance An Integrated Solid Waste System***
(County Vision Linkage to Three Elements: Maintaining Safe and Caring Communities, Practicing Environmental Stewardship, and Corporate Stewardship)
- ***Achieve Financial Viability Through Sound Financial Practices***
(County Vision Linkage: Corporate Stewardship)
- ***Maintain Or Improve Internal Management System***
(County Vision Linkage: Maintaining Healthy Economies)
- ***Provide Excellent Customer Service***
(County Vision Linkage to Three Elements: Maintaining Safe and Caring Communities, Maintaining Healthy Economics, and Creating a Culture of Engagement)
- ***Enhance and Protect The Environment***
(County Vision Linkage to Three Elements: Maintaining Safe and Caring Communities, Practicing Environmental Stewardship, and Creating a Culture of Engagement)
- ***Continue Internal and External Communication***
(County Vision Linkage: Creating a Culture of Engagement).

1. Contractual Issues and Landfill Capacity

The E/RRF continued to serve as the primary disposal location for the County, processing over 1,033,190 tons of waste. Several projects involving the E/RRF are being investigated to determine their technical feasibility and cost, including the possibility of using the E/RRF as emergency backup power for the new Fairfax Water plant.

Due to major plant maintenance at the E/RRF, coupled with routine maintenance outages and an increase in Fairfax County waste, the county bypassed over 75,000 tons of waste to landfills during the year, using contingency contracts that were in place.

As in recent years, the E/RRF received a declining amount of waste from jurisdictions outside the county. Only about 10% of waste sent to the E/RRF was from local jurisdictions such as Prince William and Loudoun Counties and the District of Columbia. Fully 89% of the waste processed at the facility was generated in Fairfax County. Almost 99% of the Guaranteed Annual Tonnage (GAT of 930,750 tons) was generated by Fairfax County residents in FY 2005. This increasing amount of waste being generated in Fairfax County is part of the reason that curbside recycling must be expanded. By reducing the amount of cardboard, mixed paper, and plastics being disposed of, the County can extend the capacity of the E/RRF to process materials that cannot be recycled.

2. Solid Waste Management (SWM) Plan Implementation

The SWM Plan, submitted to the Virginia Department of Environmental Quality in June, 2004, was approved by the commonwealth in early 2005. The plan represented over 18 months of public outreach and analysis by staff to identify the county's needs and capacity for waste collection, recycling, transportation, and disposal management through 2024. Following the extensive public outreach, public hearing process and the Board of Supervisors' approval of the plan, county staff began developing plans for implementing the next steps. Seven significant recommendations of the SWM Plan were:

- Emphasize source reduction and reuse as a priority public outreach message to residents.
- Increase curbside recycling to include plastic bottles, cardboard, and mixed paper.
- Expand recycling opportunities for all businesses.
- Study and evaluate improvements needed in residential waste collection.
- Continue to use the Energy/Resource Recovery Facility after 2011 when the construction bonds are paid.
- Explore ways to deal with construction/demolition/debris (CDD) wastes so that more is recycled and methods are available to dispose of CDD once the private landfills close.

- Expand public outreach and education to residents and the schools about waste generation rates and the need to recycle more to maintain disposal capacity at the E/RRF.

The SWM Plan discussed several issues surrounding the current system of residential solid waste collection in the County. The Board did not take any specific action on that issue, but appointed a Solid Waste Task Force (SWTF), comprised of 16 representatives of the residential waste collection industry, EQAC, customers, community representatives, and government managers, to study and resolve several customer service, environmental, operations, and communications issues identified during the development of the SWM Plan.

a. Solid Waste Task Force

The complete report of the SWTF is contained on the county's Web site at www.fairfaxcounty.gov/dpwes/swtf. The report contained 31 recommendations, 11 of which dealt specifically with environmental issues. The report examined environmental issues about:



- Using paper versus plastic bags for collection of yard waste;
- Allowing exemptions for homeowners associations from having separate collection of yard waste, if they have a grounds maintenance contractor;
- Expanding public outreach in general but especially about educating residents to manage yard waste through backyard recycling or community composting;
- Expanding e-waste collection events and adding more information to the county's Web site about the need to recycle;
- Removing Nickel-Cadmium (NiCad) and other rechargeable batteries from the waste stream and expanding the existing partnerships with private organizations to recycle batteries; and
- Coordinating emergency response.

b. Business Recycling

The Division of Solid Waste Collection and Recycling (DSWCR) held preliminary meetings with several business organizations to determine best practices about how to expand business recycling opportunities. Additional details are incorporated in the Recycling section of this chapter.

c. Residential Curbside Recycling

As a result of the SWMP, county staff has asked all collection companies to collect cardboard, mixed paper, and plastic bottles voluntarily, beginning July 1, 2005. Mandatory collection requirements for these materials will begin on January 1, 2006. This subject was also discussed and agreed upon by the Solid Waste Task

Force. These materials are in addition to aluminum and steel cans, newspapers, glass, and yard waste, which are already collected for recycling.

Fairfax County's waste generation rate is about 6.8 pounds per person per day currently. The county desires to recycle additional materials in future years in order to maintain sufficient capacity at the Energy/Resource Recovery Facility (E/RRF), where trash is processed to generate electricity.

d. Increased public outreach

One main theme from the SWTF was increasing public outreach for all aspects of the program. County staff is currently in the process of revising printed brochures containing information about all solid waste programs. The Web site has undergone an extensive update and now offers additional information for all residents and businesses. Additional public outreach is planned, such as targeting various media to get educational messages distributed to county residents about recycling, composting, waste reduction and reuse, and proper disposal of trash.

e. Continue to use the E/RRF after 2011 when the construction bonds are repaid

Work on the renegotiation of the contract with Covanta Fairfax, Inc., the private owner of the E/RRF, has begun. The initial work to develop a project management plan showing the steps required to be completed through 2011. County attorneys, engineering consultants, other professionals, and county staff are analyzing and evaluating the Service Agreement with a view toward what the agreement should be in 2011.

f. Explore ways to deal with construction/demolition/debris (CDD)

Preliminary conversations have begun about how to deal with CDD and how to best increase recycling of these materials. Since local CDD landfills report about seven years of capacity remaining, there is sufficient time to complete a thorough analysis of the markets, methods, uses, and costs of recycling CDD.

3. Use of Credit Cards

The citizens' disposal facilities began accepting credit cards on a pilot basis in early FY 2005. The initiative was so popular that it became an integral part of customer service, as about 13,418 transactions were paid by credit cards this year. Additionally, in FY 2005, the Solid Waste Collection and Recycling Division began allowing sanitary district customers to use credit cards to process payments for collection of oversized materials.

4. Solid Waste Disposal Fee

The contract waste disposal fee, offered to companies that sign agreements with the county, increased to \$42.45 per ton for FY 2005. The contract disposal fee covers transportation and disposal of waste, but does not fully cover the cost of all community benefit programs (e.g. recycling education, household hazardous waste, enforcement, and community cleanups) supported by the Solid Waste Management Program. In FY 2005, the General Fund transfer for solid waste community benefit programs was \$2.5 million.

In FY 2006, the disposal fee for waste disposed by collection companies will be raised by \$2.50 to \$44.95 per ton for all Fairfax County waste. The increase will help to offset increasing costs due to escalating fuel prices and contractual payments.

Staff evaluated the fees that residents and commercial cash customers pay to bring their waste to the citizens' disposal facilities this year. Using activity based cost analyses, staff determined that the current rate of \$55 per ton for trash adequately covered the costs associated with transportation and disposal of the waste. No increase will be needed in FY 2006 for trash disposal, although the costs for certain individual materials such as yard waste will increase to \$44.95. Prices for all materials are posted on the county's Web site.

B. PROGRAMS, PROJECTS, AND ANALYSIS

1. Waste Disposal

a. I-95 Sanitary Landfill and Citizens' Disposal Facility

i. Groundwater Monitoring

Groundwater Protection Standards (GPS) were established for the I-95 Landfill on November 20, 2000, through an amendment to the facility permit. In accordance with Waste Management Regulation 9 VAC 20-80-250.D.6.g, an Assessment of Corrective Measures (ACM) report was submitted to VDEQ in August, 2002. The VDEQ commented on the ACM and the county addressed VDEQ's comments by submitting a revised ACM and Corrective Action Plan (CAP) on April 30, 2004 for approval. The report includes the nature and extent of groundwater contamination, risk assessment, and proposed corrective action. The county has proposed to implement a five-part remedy for groundwater at the I-95 Landfill. Proposed components of the program consist of:

- Institutional controls;
- Engineering controls;
- Monitored natural attenuation;

- Accelerated bioremediation (reductive dehalogenation); and
- Direct oxidation.

The county will implement institutional controls in accordance with the closure and post closure care plan. A variety of engineering controls (leachate collection, landfill gas system, and placement of cover) will be used. As presented in the ACM, the concentration of most regulated constituents began to attenuate relatively abruptly after engineering controls were implemented during the 1990s. Natural attenuation will be enhanced by injection of food grade material that will enhance microbial activity via reductive dehalogenation. Direct oxidation will be employed in one area of the facility. Two common forms of permanganate (potassium and sodium) will be used. Both are strong oxidizing agents. This will be done in the selected areas. A Corrective Action Monitoring Plan has been submitted to VDEQ along with the Corrective Action Plan (CAP).

As part of the investigation, the county has drilled and sampled 16 additional monitoring wells to further delineate and remediate any groundwater problems. Staff will continue to perform the groundwater monitoring to comply with the VDEQ's requirements of assessment monitoring. Further, staff will monitor the additional parameters at supplemental locations as specified in the CAP. These proactive steps will be used at the I-95 Landfill to assure protection of the groundwater resources. These advanced steps are believed to be among the first used at a Virginia landfill.

ii. Landfill Closure

Closure work continues ahead of schedule for the sections of the I-95 Sanitary Landfill that are undergoing final closure. Final closure consists of a thick low permeability soil layer to minimize surface water infiltration into the landfill. Additional landfill gas control systems are also being installed to control the generation of landfill gas. Placement of the closure cap started during May, 2003, and is expected to be completed by 2006 on the raw-waste portion of the landfill.

Closure of the first ash landfill cell will also begin during FY 2006. This 12 acre cell will be capped by using a synthetic landfill cap, and closure is anticipated to cost nearly \$3 million.

iii. Landfill Gas System and Air Emissions



The I-95 Landfill also has one of the largest landfill gas collection systems installed at any facility in the state of Virginia, with over 300 extraction wells installed specifically for the purpose of collecting methane gas for utilization. Approximately 3,000 cubic feet per minute (cfm) of landfill gas is collected and distributed to a variety of devices,

including two power plants operated by Michigan Cogeneration Systems (MCS) that generate over 6.1 megawatts of electricity, and through a pipeline to the Noman M. Cole Pollution Control Plant (NMCPCP). Nearly 20 landfill gas wells were replaced during FY 2005, as the wells occasionally become pinched during normal landfill settlement.

A gas distribution pipeline, a joint project between the county, MCS, and the NMCPCP, carries landfill gas to NMCPCP for the biomass incineration facility. This pipeline is over three miles in length and continues to result in significant savings in energy costs at the NMCPCP, estimated in 2004 at nearly \$1 million for the year.

During FY 2005, staff from the county, with assistance from an outside contractor, converted the landfill shop facility to be heated by landfill gas instead of bottled propane gas. This conversion is expected to save several thousand dollars in heating cost each year.

The county is in compliance with the VDEQ's air regulations. Quarterly methane gas surface emission and perimeter monitoring are performed. Annual air emission reports have been submitted to VDEQ. VDEQ has found all to be acceptable.

iv. Ash Landfill

Incinerator ash is accepted at the I-95 Landfill from the NMCPCP and the Covanta Energy/Resource Recovery Facilities located in Alexandria and Lorton. Ash is placed in a double composite, lined landfill with state-of-the-art leachate collection and detection systems.



Construction of Phase IIB of the ash landfill (the third cell) was completed in November, 2004. Disposal of ash in this cell began during May, 2005. Approximately 1,000 tons of ash is placed daily in the new cell. This cell has capacity for ash disposal for three years and four months. Approximately 6,000 tons of shredded tires were used as a protective layer for the cell. Using

this material not only recycled the tires, but also saved \$85,500 in the cost of gravel and other aggregate materials. Overall, the savings on the project amounted to \$220,500.

Ash resulting from the combustion process reduces the waste to only 10% of its original volume and about 25% of its weight. Ash generated by the E/RRF is disposed in a much smaller area of the I-95 Landfill when compared to the amount of space that would be needed to dispose of the same quantity of unburned municipal solid waste. In December, 2004 and January, 2005, ash produced at both the facilities was analyzed by an independent lab and found to be within the permit limits for all constituents.

A dolomitic lime system added to the E/RRF chemically binds heavy metals with the ash to reduce leaching of metals into the groundwater. A constituent of potential concern is cadmium in the ash. Staff has supported and publicized efforts to collect rechargeable Nickel-Cadmium (NiCad) batteries separately for recycling. Through a partnership with the Rechargeable Battery Recycling Corporation (RBRC), retailers such as Wal-Mart, Radio Shack, and Best Buy collect old batteries as new ones are sold. The batteries are recycled at a permitted waste management facility specifically designed to recover metals. These small efforts will significantly reduce the amount of cadmium in the ash.

v. Citizens' Disposal Facility (CDF)

The CDF allows county residents and small businesses to bring their waste directly to the I-95 Complex for disposal. The CDF offers a full range of recycling opportunities as well as household hazardous waste (HHW) disposal. Recycling is free to residents and a small charge is made for some HHW materials. Waste is disposed at \$55 per ton. In FY 2005, over 72,000 visits occurred at the I-95 CDF.

b. Energy/Resource Recovery Facility (E/RRF)

i. Overview

The E/RRF, owned and operated by Covanta Fairfax, Inc. (CFI), continues to operate within accepted industry standards as evidenced by the independent engineering report from Dvirka and Bartilucci in April, 2004. The report states, “CFI has complied with the requirements of the Service Agreement, as amended, and has complied with the requirements of the various facility permits.” Operational upgrades to the facility have improved the overall performance of the facility and helped maintain a high availability of the facility during the past year.



These changes included:

- Addition of inconel (a hardened metal alloy) to the refractory of the furnace walls to extend the life of the refractory;
- Modernization of pit cranes;
- Overhaul of electric Turbine A during the cold iron outage;
- Improved combustion processes that resulted in decreased amounts of ash being produced over the past few years;
- Computerization of prevention and corrective maintenance requests tracking; and
- Addition of dolomitic lime to the ash conditioning system to reduce leaching of metal from ash that is landfilled.

A complete plant shutdown occurred in October, 2004 to perform scheduled maintenance that could only occur with the plant not running. The “cold iron outage,” as it was termed, was one of the significant events at the E/RRF in FY2005. During the month leading up to the five-day outage and the month following, staff carefully managed waste going to the E/RRF so that the waste pit would be almost empty at the time of the outage and not overflow when no waste was being processed. During the outage, parts of the facility that operate constantly were inspected and preventive maintenance performed. This increased level of maintenance is necessary about every five years to ensure the continued efficient operation of the facility.

The E/RRF continued to produce up to 80 megawatts of electricity that was sold to Dominion Virginia Power. This is enough energy to power about 76,000 homes.

ii. 15th Anniversary of E/RRF

During 2005, the E/RRF is celebrating 15 years of operation. Some of the exceptional statistics for the facility are that, since 1990, the E/RRF:

- **Processed 15 million tons of solid waste** (as much waste as was buried in the 260 acres of the I-95 Landfill from 1970 to 1995);
- **Generated 7.6 billion kilowatt hours of electricity** (enough power to serve about 76,000 homes for 15 years);
- **Saved the equivalent heating value of 26 million barrels of oil** that would be needed to produce the same amount of electricity; and
- **Saved total landfill capacity of 16,200 acre/ft by volume reduction** through processing at the E/RRF (enough space to fill a football stadium full to a height of almost a mile). Only 10% by volume of the waste remains after it is processed at the E/RRF.



Various permits continue to be under review by the Department of Environmental Quality as part of the ongoing regulation of the waste to energy industry.

iii. Quantity of Waste Processed

The county has guaranteed to provide, and the E/RRF has agreed to process, at least 930,750 tons per year of waste. In FY 2005, the E/RRF processed over 1,033,190 tons of waste (approximately 86,000 tons per month). Waste from Fairfax County accounted for 919,125 tons, with the remainder coming primarily from Prince William County. Due to scheduled outages, the cold iron outage, seasonal peaks in waste generation and other reasons, about 75,000 tons of waste were bypassed to landfills during the fiscal year.

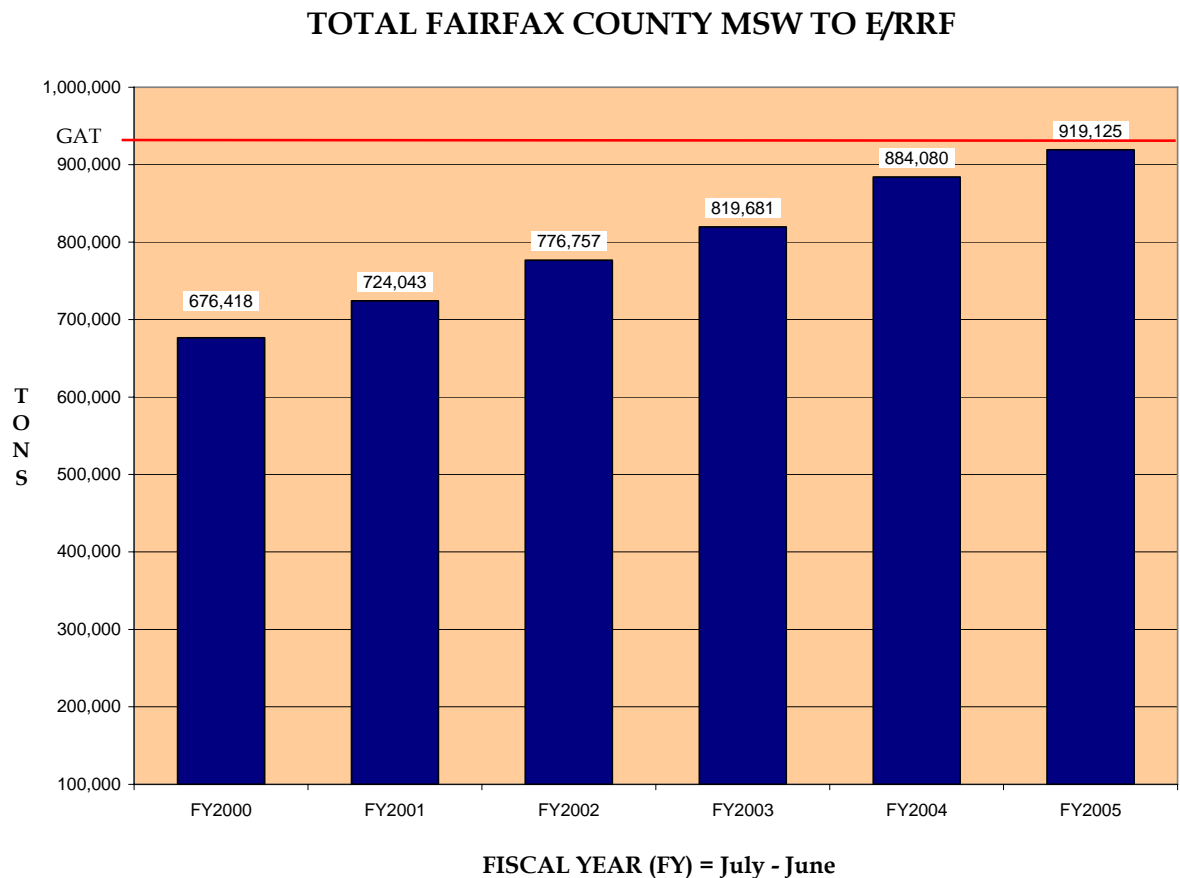


Figure IV-1. Total Fairfax County MSW to E/RRF: FY 2000-2005

iv. Air Quality

The E/RRF's continuous emissions monitoring system (CEMS) samples flue gas emissions and alerts Covanta staff to any areas that need attention. Permit exceedances must be reported to the VDEQ with an explanation as to the circumstances of the event. The E/RRF continues to operate well within the permit parameters for air emissions. The following stack emissions for certain constituents were documented by an independent lab test in June, 2004 and reported to VDEQ:

Table IV-1 Energy/Resource Recovery Facility Emissions Results: June, 2004		
Parameter	Permit Limit	Average E/RRF Result
Sulfur Dioxide (SO ₂)	29 ppm	8.8 ppm
Carbon Monoxide (CO)	100 ppm	9 ppm
Nitrogen Oxides (NO _x)	206.3 pph	193 pph
Hydrochloric acid (HCl)	29 ppm	3.9275 ppm
Particulate matter (PM)	27 mg/dscm	5.1575 mg/dscm
Dioxin/furans	30 ng/dscm	0.688 ng/dscm
Mercury (Hg)	80 ng/dscm	1.39125 ng/dscm

ppm = parts per million

pph = pounds per hour

mg = milligram

ng = nanogram

dscm = dry standard cubic meter

Source: Fairfax County Department of Public Works and Environmental Services

v. Materials Recovery

The E/RRF affords the ultimate in recycling of waste in that it takes waste and uses it to heat water to steam that turns turbines generating electricity. Moreover, once the process is complete, ferrous metals are recovered from the ash residue and recycled. In FY 2005, 19,915 tons of ferrous metal and 278 tons of non-ferrous metal were recovered from the ash and sold for recycling.

During FY 2005, Covanta discontinued operating the non-ferrous recovery system. This system was found to be ineffective to operate, due to high operating costs and poor market values for the recovered materials; further it was not a contract requirement for the facility.

c. **I-66 Transfer Station & Citizens' Recycling and Disposal Facility**



The I-66 Transfer Station continues to handle roughly 75% of the waste destined for disposal in the county. The Transfer Station consolidates waste from small collection vehicles prior to transporting the waste to the E/RRF. Further,

the Transfer Station plays a pivotal role when waste needs to bypass the E/RRF to landfills; in FY 2005 over 75,000 tons of waste was hauled from the Transfer Station to landfills. The VDEQ inspected the Transfer Station in June, 2005 and found that it was being operated within its permit limits.

i. Citizens' Disposal Facility (CDF)



The Transfer Station also serves as one of the county's two citizens' recycling and disposal facilities (CDF), where residents and small businesses can self-haul their waste and recyclables. In FY 2005, more than 254,000 visits were made to the I-66 CDF. The CDF is also being redesigned to accommodate the increased demand for disposal and recycling services at that

location. New scales and booths, improved entrance and egress, and more technology are being planned to improve customer service and reduce wait times. These changes will likely not be completed until late FY 2007.

ii. Transfer Operations

One of the main responsibilities at the Transfer Station is to move waste from northern and western parts of the county to the E/RRF. With increased building and population growth, waste collection companies are bringing more waste to the Transfer Station. Roughly 75% of the residential waste generated in Fairfax County is disposed of at the Transfer Station. Small collection trucks dump their loads on the tip floor, where the material is consolidated into larger tractor trailers. County staff relies on a contractor to provide additional drivers and vehicles that augment the county's fleet of tractor trailers. Approximately 140 trailer loads of waste move from the Transfer Station to the E/RRF and other disposal locations daily, reducing by two-thirds the number of trucks traveling to the I-95 Complex.

The County vehicle fleet, including the transfer trucks at the Transfer Station, now uses ultra-low sulfur diesel fuel. The purpose is to reduce air emissions as much as possible, while performing the mission of transporting increasing amounts of waste.

A contract has been solicited for the design and installation of an automated truck wash operation to be located in the existing truck wash building. The state-of-the-art system will recover and recycle water, discharging minimal amounts to the sewer, while reducing manpower requirements to wash large vehicles. County solid waste collection vehicles will be able to be washed here as well.

d. Household Hazardous Waste (HHW) Program

Information regarding the Household Hazardous Waste Program and the Conditionally Exempt Small Quantity Generator (CESQG) service is provided in the Hazardous Materials chapter of this report.

e. Other Programs

i. Program Enforcement

Fairfax County issues permits to all solid waste collection companies prior to allowing them to operate in the county. County staff has the responsibility to enforce violations of Chapter 109 of the Fairfax County Code; staff has been added in order to improve enforcement efforts. This is in response to an increased number of customer complaints about missed service and mixing recyclables with trash.

In February, 2005, the Board of Supervisors approved several administrative revisions to Chapter 109. An extensive rewrite of Chapter 109 is underway in order to address many of the measures that are needed to improve service delivery for county residents. Additionally, staff has historically updated the solid waste code on five-year intervals, but has moved the process to an annual review.

ii. Environmental Enterprise Designation



Since August, 2003, when VDEQ presented the Board of Supervisors with a certificate designating Fairfax County as an Environmental Enterprise (E2), the SWMP has met its environmental targets and reports.

While participation in the Virginia Environmental Excellence Program is voluntary and on a department by department basis, to be considered for inclusion as an Environmental Enterprise, an organization must submit an application with the following information for each of its facilities under consideration:

- Policy statement outlining the facility's commitment to improving environmental quality;
- An evaluation of the facility's environmental impacts;
- Objectives and targets for addressing significant environmental impacts; and
- Description of the facility's pollution prevention program.

In addition, the organization must have a record of significant compliance with environmental laws and be in significant compliance with all applicable environmental requirements.

The SWMP is currently working toward certification as an Exemplary Environmental Enterprise (E3) program. The E3 level of participation is for those organizations with a fully-implemented environmental management system (EMS), a pollution prevention program, and demonstrated environmental performance. At the time of writing, the County's solid waste program has begun to develop the EMS and P2 programs required for E3 status, and expect to apply for this enhanced designation late in 2005.

During FY 2005, the SWMP also became a founding member of Businesses for the Bay (B4B). The mission of B4B is to build support for pollution prevention among all businesses throughout the watershed. Its goal is to contribute to the long term and voluntary improvement of the quality of the Bay and its rivers through widespread implementation of pollution prevention practices throughout the watershed.

2. Waste Reduction and Recycling Programs

a. Overview of Recycling Programs

The Fairfax County Solid Waste Management Program, Division of Solid Waste Collection and Recycling (DSWC&R) is responsible for the management and implementation of the countywide recycling program to ensure compliance with Fairfax County's solid waste management code, Chapter 109, and state law and associated regulations. The VDEQ is responsible for administering regulations that require all municipalities in the Commonwealth to recycle at least 25 percent of the total volume (by weight) of municipal solid waste (MSW) generated in the jurisdiction. These regulations are codified as 9 VAC 20-130-10 and became effective on August 1, 2001. Annual reports documenting the recycling rate for the preceding calendar year are now due to the VDEQ by April 30 each year.

Fairfax County currently administers Chapter 109, Solid Waste Regulations, which provides the minimum requirements for solid waste collection, recycling, and disposal for collection companies, residences, and commercial properties located within Fairfax County.

The county requires annual reports on the tonnages of recyclables collected by individual solid waste collectors permitted to operate in the county, commercial businesses that generate regulated quantities of MSW, and the Material Recovery Facilities (MRFs) and other recycling entities operating in Fairfax County. These reports are due to the county by the end of February of each year. These reports are evaluated and data compiled to calculate the countywide recycling rate, which for calendar year 2004 was 32%. Figure IV-2 depicts the historical quantities of recyclables collected in the county since the recycling program's inception in 1988. Fairfax County continues to exceed the state-mandated requirement to recycle at least 25% of the total amount of solid waste generated within its borders.

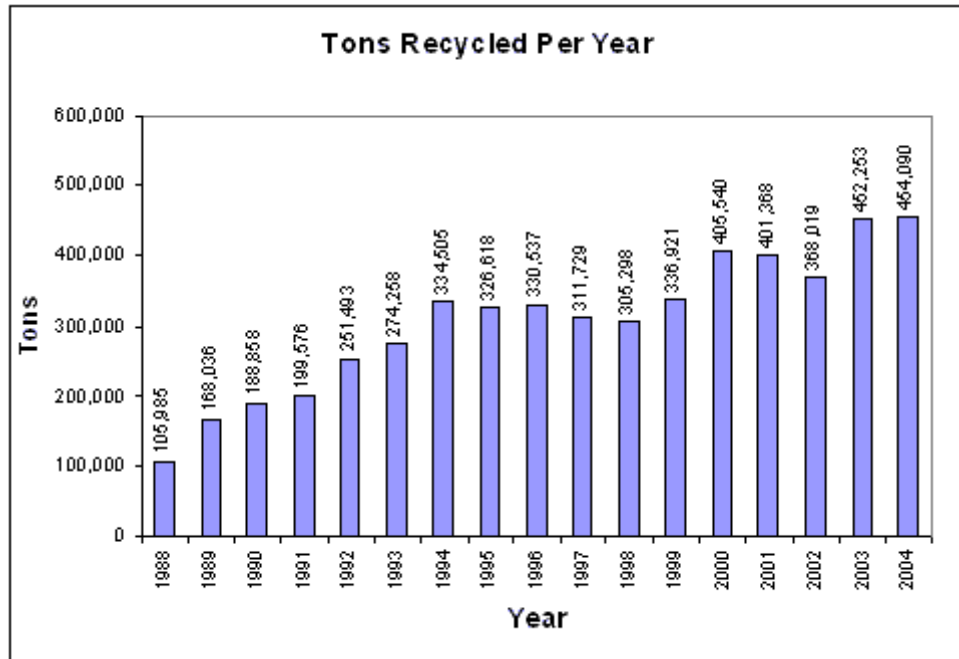


Figure IV-2. Historical Quantities of Materials Recycled in Fairfax County

To thoroughly understand how recycling works in the county, it is important to distinguish between the types of recycling programs in effect in the county. The two major county recycling programs are the curbside residential collection of recyclables and the business recycling program.

Curbside residential collection of recyclables is controlled by Chapter 109, which requires the collection of newspaper, glass food and beverage containers, metal food and beverage containers, and yard waste. During the evaluations conducted for the 20-year solid waste management plan and the activities of the Solid Waste Task Force, recommendations were made to require all permitted collection companies operating in the county to collect additional recyclables curbside from all single-family and townhomes in the county. These additional materials are mixed paper, flattened cardboard, and plastic bottles and jugs. They are the identical recyclables that have been collected curbside (since 2000) from residents in sanitary districts, where collection is provided by the Fairfax County Division of Solid Waste Collection & Recycling (DSWC&R).

Permitted collection companies have agreed to voluntarily initiate the curbside collection of these additional materials starting July 1, 2005, with the collection for recycling becoming mandatory on January 1, 2006. The county has also agreed to provide outreach assistance to the collection companies to help ensure a uniform recycling message to residents across the county.

Business recycling requirements are also planned to be revised during the coming year. Many businesses operating in the county are covered by recycling

requirements, while others are not. The following businesses *currently* are required to recycle in the identified fashions:

- Office buildings - recycling is required only if the office building has more than 200 full-time employees. If recycling is required, then only the recyclable material generated in the highest quantity must be recycled.
- Commercial Business Centers (strip malls, large shopping malls, commercial business parks etc.) - recycling is required only if the businesses in the commercial business center generate more than 100 tons of refuse per year. If the commercial business center generates more than 100 tons of refuse per year, then only the recyclable material generated in the highest quantity must be recycled.
- Multi-family housing (apartment and condominium complexes only - not townhome developments) - recycling is required only if the building has more than 100 units; no recycling is required if the building has 99 units or less. If the building has more than 100 units, only newspaper, and no other commodity, must be recycled.

The county's 20-year solid waste management plan recommended that business recycling be expanded in the county. To that end, staff is presently creating a plan to have detailed conversations with a variety of businesses in the county to determine the best approaches to successfully improving business recycling in the county. These activities are currently underway, and will end with a revision to the Fairfax County Code to codify the new requirements.

b. Other Collection and Recycling Programs

In addition to countywide recycling program management, the Solid Waste Management Program staff is responsible for the:

- Collection of refuse and recyclables from about 43,000 residences, primarily on the east side of the county;
- Collection of refuse and recyclables from county-owned buildings;
- Seasonal vacuum leaf collection from approximately 20,000 residences;
- The Recycling Drop Off Centers (RDOCs);
- Refuse removal due to evictions and other court orders; and
- All public outreach and education for recycling and waste management programs.

Brief descriptions and updates of programs are provided in the subsequent sections of this report.

i. Residential Recyclables Collection Programs

Residential recycling of several Principal Recyclable Materials (PRMs as defined by VDEQ regulations) became mandatory in 1992 for all single family homes, residential townhouses, apartment complexes, condominium units, and residential duplexes with curbside collection. PRM recycling became mandatory in 1993 for residential units and building complexes with dumpster service, and curbside residential collection of recyclables is regulated under Chapter 109 of the Fairfax County Code.

Weekly curbside collection of newspaper and glass and metal food and beverage containers is required to be conducted at all residences with curbside collection services provided either by county employees in the Sanitary Districts or by the other private collectors permitted to operate in the county. For multifamily dwellings such as apartment buildings and condominiums, recycling is required only if the building has more than 100 units; no recycling is required if the building has 99 units or less. If the building has more than 100 units, only newspaper, and no other commodity, must be recycled.

In order to ensure that new multifamily dwellings are designed (prior to construction) to provide adequate common areas for the installation and operation of recycling equipment, amendments were made to the Fairfax County Public Facilities Manual that became effective for new Site Plans submitted after September 1, 1993. The amendments require that, in any new construction of multifamily residential complexes with more than 100 units, a space be provided to accommodate recycling for the building. A Recycling System Statement on the Site Plan cover sheet identifies properties required to recycle, so that appropriate facilities may be designed prior to building construction. These requirements do not apply to townhome residential complexes that will have curbside collection of refuse and recyclables, because they are provided with curbside recycling service.

ii. Yard Waste

Recycling of yard waste (small branches, leaves and grass) is also required for residential units in Fairfax County. Curbside collection of yard waste is required to be provided by all refuse and recyclables collection companies operating in the county. The county provides this service to approximately 43,000 customers in Sanitary District areas.

Woody materials, referred to as brush, comprise a portion of the overall quantity of yard waste collected in the county. Brush is managed at either the I-66 or I-95 facility and is ground into mulch if it is unbagged. The mulch from these facilities is available for free to county residents who can self-haul the material to the end use location. Mulch is typically used as a top-dressing around decorative plantings to reduce weed growth and to maintain soil moisture.

Leaves and grass comprise the balance of the total quantity of yard waste managed in the county. This material is generally collected in bags and is sent to either of two composting facilities, where the material undergoes a biological decomposition to turn it into compost, which is used as a soil substitute. In 2004, 122,710 tons of yard waste were recycled in Fairfax County.

iii. Recycling Drop Off Centers (RDOCs)

Fairfax County operates eight Recycling Drop Off Centers located at various locations throughout the county. The number of RDOCs has decreased from the fourteen available in 1995, since participation in curbside recyclables collection reduces the need for the RDOCs. However, the RDOCs provide additional recycling opportunities for residents or businesses served by privately-owned refuse and recyclables collection companies that are not required by Chapter 109 to collect these additional materials (mixed paper, cardboard, and plastic bottles and jugs). These RDOCs are relied upon by small commercial operations in the county to facilitate their recycling while reducing their costs for refuse disposal.

iv. County Agency Routes

All county agencies serviced by county staff for the collection of refuse and recyclables participate in recycling for that particular location. In calendar year 2004, county agency locations recycled approximately 735 tons of materials. The Solid Waste Management Program staff provides all backup support to ensure adequate communication of the recycling requirements as well as operational support for general programs or other special activities as needed.

v. Public Education and Outreach

Public education and outreach form the basis of any county's recycling efforts. To that end, the county's Solid Waste Management Program focuses on the development and implementation of creative education programs that can take advantage of partnerships with county agencies, Fairfax County Public Schools, community organizations (i.e., Girl/Boy Scouts, Youth Groups, Jaycees), commercial businesses, and private haulers. Outreach programs consist of activities and displays at county festivals, the support and advertisement of several days every year specifically dedicated to recycling efforts, public speaking opportunities, and technical support of recycling activities and issues.

Annually, the Solid Waste Program participates in Clean Fairfax Council's Earth Day/Arbor Day event, Celebrate Fairfax, and Fall for Fairfax. These events are a major portion of the county's overall public outreach campaign and provide the program with the opportunity to provide technical guidance as well as practical information about the county's solid waste and recycling programs.

In 2005, the Solid Waste Program won Best of Show at the Celebrate Fairfax event in June with an interactive display of equipment and programs.

The Solid Waste Management Program is a sponsor of the annual Earth Day/Arbor Day event promoted by Clean Fairfax Council. This year, the Solid Waste Management Program supported the Johnie Forte Jr. Environmental Scholarship, which awarded ten \$500 scholarships to applicants from the Fairfax County Public Schools. Student groups receiving the grants are invited to the annual Earth Day/Arbor Day celebration at Northern Virginia Community College to make a presentation regarding the use of the grant to the community and the Board of Supervisors. The annual Fairfax County Business Recycling Awards are also presented at the same event; this year, awards were given in four categories to:

- Raytheon Corporation - Continuing Excellence;
- U.S. Army Garrison, Fort Belvoir – Government;
- Mitretek - Large Business; and
- The Peterson Company – Property Management.

This environmental scholarship program for school students is a portion of SCRAP, the Schools/County Recycling Action Partnership. The SCRAP partnership was created by the Fairfax County Public Schools and Fairfax County Division of Solid Waste Collection & Recycling (DSWC&R) to provide opportunities for the students of Fairfax County Public Schools to learn about recycling and other environmental issues and enhance recycling throughout the system. The Partnership functions in a cooperative and collaborative manner to assist in increasing the recycling awareness and practice at Fairfax County Public Schools (FCPS) by:

- Developing opportunities for students to learn about recycling and other environmental issues;
- Providing support for school recycling activities to assist achieving recycling goals; and
- Providing environmental science expertise to support student projects and activities.

The Partnership unites the resources of both organizations in a unique relationship to expand upon and enhance the existing FCPS recycling program for the benefit of the schools and the environment. DSWC&R originated the SCRAPbook, a resource tool distributed to all science teachers in the FCPS system. This brochure details all of the opportunities provided by DSWC&R and Clean Fairfax Council to aid in the instruction of students, including training and presentations, tours, and details of application for the Johnie Forte grant award.

In April, 2005, Fairfax County partnered with FCPS's Chantilly Academy to recycle obsolete electronics. Usable computers were donated to the Academy to support the school's computer operation and repair classes for students. Additionally, 35 families with students enrolled in FCPS in need of computers were given refurbished equipment repaired by students attending the Academy. Training on how to operate the equipment was provided by students and teachers of the Academy. Over 700 residents donated computers and about 50 tons of obsolete computer equipment was reused or recycled rather than sent for disposal.

The Solid Waste Management Program also promotes an annual Clean Your Files Week, geared to county agency staff to remind staff of the benefits of recycling of office paper. This effort is managed by the Employee Recycling Committee (ERC). The ERC meets monthly and works on projects beneficial to improving county employee participation in recycling. The group coordinated and implemented several projects this year including: the Clean Your Files Week contest; the county employee's Earth Day celebration; participation in America Recycles Day, and the Employee Recycling Committee Recycler of the Year award (the ERICA award).

The Clean Your Files Week contest provided an award, prizes, and publicity for the winning agency in the county's newspaper, the Courier. The contest encourages office workers to recycle more paper and creates a team-building for staff in county agencies. More than 60 additional tons of paper were collected from county office buildings during the month-long contest.

The Earth Day celebration concentrated on the participation of many county agencies with responsibility for environmental protection and stewardship in the county. These agencies placed informational booths in the Government Center during the lunch hour so that all employees could better understand services provided by these agencies.

The ERICA award is presented to the county employee(s), individuals or groups who demonstrate exceptional commitment to recycling in the workplace. A formal presentation is made to the winner(s) at their agency's workplace to demonstrate appreciation to that agency for allowing the employee to participate in recycling. These activities have strengthened the county employees' resolve and dedication to recycling.

America Recycles Day (ARD) 2004 was celebrated on November 13th with the Community Recycling Roadshow at Herndon High School. County staff again partnered with volunteers to show how recycling activities can support the local community. Students Against Global Abuse (SAGA), the student environmental club at Herndon High School, helped staff collect computers, cell phones, bicycles, and eyeglasses. ServiceSource, a sheltered workshop for

adults with disabilities, collected over 20 tons of used computers and other electronic equipment at this single event.

OAR of Fairfax (Opportunities, Alternatives and Resources) collected 274 used cell phones for victims of domestic violence. Pedals for Progress collected 130 bicycles to be shipped overseas to help people who need basic transportation. Eyeglasses were collected by the Reston Lion's Club for overseas medical clinics. In addition to these nonprofit agencies, other partners included Herndon High School, Town of Herndon, Clean Fairfax Council, Amphora Bakery, and Safeguard Shredding, Inc., which provided free shredding and recycling of sensitive documents. America Recycles 2004 is a nationwide celebration with community-based events that bring together many organizations and people. Locally, Fairfax County Public School students were invited to write an exciting adventure for the Recycle Guys, the colorful mascots of the recycling program. Winners were chosen from submissions from each of three age groups. Each winner received a gift certificate to a bookstore.

Public outreach and education is accomplished through involvement in community events and public speaking opportunities as well as the Solid Waste Program's membership in the Lorton Citizens Alliance Team (LCAT), Business Advisory Committee, and Citizens' Advisory Committee on Solid Waste.

The Solid Waste Management Program takes full advantage of the Internet by placing pertinent information about timely subjects on its Web site. Information about the program's involvement in community events as well as new information about solid waste matters is updated on the Web at:
www.fairfaxcounty.gov/gov/dpwes.

Staff routinely updates all of the written publications to account for changes in programs and activities. Publications are revised to ensure the clarity of the contents and that they are informative and present information in a suitable fashion to address a particular question or issue. All publications will eventually be available on the county Web site to allow for the ease of access and printing for distribution. Additionally, the county maintains an automated recycling information line (703-324-5052) for resident access to recycling opportunity information.

The Solid Waste Management Program staff is also using the Web to disseminate information to citizens as well as the regulated community as a service to customers. An electronic e-mail to county collection customers has been developed to automatically send updates to customers on the program as well as updates regarding service due to inclement weather. A similar listserv tool was developed to give vacuum leaf collection customers the most up-to-date information on the exact dates that the leaf collection will be conducted on their streets to ensure that residents have time to rake leaves to the curb.

REFERENCES

All materials were supplied by the Division of Solid Waste Collection and Recycling and the Division of Solid Waste Disposal and Resource Recovery.

ANNUAL REPORT ON THE ENVIRONMENT

CHAPTER V

**HAZARDOUS
MATERIALS**

V. HAZARDOUS MATERIALS

A. ISSUES AND OVERVIEW

1. Overview

Fairfax County hazardous materials (HAZMAT) concerns may be considered less significant as compared to other jurisdictions; the industrial base within the county is relatively “clean.” Nevertheless, the county does have its share of problems. The main concerns are hazardous materials incidents involving spills, leaks, transportation accidents, ruptures, or other types of emergency discharges. Secondary is the use and disposal of hazardous materials in either daily household activities or by small quantity commercial generators. The final concern is the clean up and regulation of hazardous materials.

Although the news media is constantly reporting industrial and transportation related hazardous materials incidents, there is a general lack of awareness by the public of health and safety risks associated with the use, storage, and disposal of common household hazardous materials. Educating the public on the implications of these hazardous materials on peoples’ lives remains a significant goal.

2. Hazardous Materials Incidents

a. Overview of 2004 Hazardous Materials Incidents

The Hazardous Materials and Investigative Services Section personnel respond to reported incidents and investigate complaints of potential and actual releases, many of a non-emergency nature. During CY 2004, Staff was involved with 552 complaints (125 more than the previous year). Two hundred eighty complaints were petroleum product releases (82 more than the year before), and 67 complaints were various types of other product releases (28 more than the previous year). Storm drains, creeks, and/or streams were reported to have been directly contaminated in 36 cases. This is a slight decrease from the previous year. (1)

b. Hazmat Response Team Information

The Fire and Rescue Department’s Operations and/or Hazardous Materials and Investigative Services Section respond to all reported incidents of hazardous materials releases, spills, and discharges. The county has a well-equipped hazardous materials response team. The primary unit operates from Fire Station 34 in Oakton, and three satellite units are stationed at Fire Station 1 in McLean, Fire Station 11 in Alexandria area of Fairfax County, and Fire Station 26 in Springfield. These units are strategically positioned

to provide rapid response and adequate coverage throughout Fairfax County. Response personnel are trained and equipped to initiate product control and mitigation measures to prevent or minimize the adverse environmental impact and damage. All units are staffed 24 hours per day, seven days per week. (2)

The Hazardous Materials Response Team responded to more than 439 incidents in CY 2004 (a reduction of more than half of the responses the previous year). These incidents included the release of products into the air, water, and soil. In addition, there were 29 reports of improper disposal of various hazardous materials and solid waste in CY 2004 (1). The Team conducted regular training sessions, as well as practical exercises, with surrounding jurisdictions, as well as with state and federal agencies. (2)

In addition to the efforts of the Operations Division and Hazardous Materials Investigative Services Section personnel, the Fire and Rescue Department maintains a contract with a major commercial hazardous materials response company to provide additional support for large-scale incidents. The Fire and Rescue Department has stressed its commitment to protecting the environment and citizens through proper enforcement of the Fairfax County Fire Prevention Code and through rapid identification, containment, and cleanup of hazardous materials incidents. (2)

c. Hazmat aftermath from Hurricane Isabel

The Hazardous Materials Response Team presented an overview of the aftermath of Hurricane Isabel to the Fairfax Joint Local Emergency Planning Committee. After the hurricane, special hazardous materials disposal facilities were set up in the Belle View Community area and members of the team were present throughout the week following the hurricane. Natural gas leaks and fuel oil spills were the primary hazardous materials issues. Older homes had fuel oil located in basements or outside of the houses. Some tanks broke loose in the flood and were floating in the flood waters. (3)

3. Hazardous Materials in the Waste Stream

The disposal of household and small quantities of non-household hazardous materials into the waste stream continues to be a concern. Unlike hazardous materials incidents, the immediate impact is not as dangerous. However, the long-term impact can be just as severe. Hazardous materials in the waste stream are contaminating landfills. Sometimes hazardous materials are dumped illegally, which leads to stream and groundwater pollution and soil contamination. Household hazardous wastes are products used in and around the home that are flammable, corrosive, reactive, or toxic. These hazardous materials potentially can cause a safety problem if various household chemicals

become mixed when disposed of with the regular trash. By disposing of household hazardous wastes separately in the appropriate manner, these materials can be properly handled and packaged to minimize exposure to potentially harmful chemicals and decrease the likelihood that these chemicals will enter the environment.

a. Used Automotive Oil and Fluids

According to a recent study, more than 50% of motorists change their own oil. Some of the oil is disposed of properly at a used-oil recycling center. Millions of gallons of used motor oil are being disposed of in garbage cans, sewers, storm drains, and backyards – practices that can contaminate soil and local streams, rivers and bay. The U.S. Environmental Protection Agency (EPA) believes that the largest single source of oil pollution fouling our nation's waters come from do-it-yourselfers. (4)

As a part of its ongoing effort to educate all Americans on environmental responsibility, the EPA recently launched the **“You Dump it, You Drink It”** campaign, aimed at the Hispanic automotive repair and service industry and consumers. Despite the fact that about half of all automotive mechanics in the United States are Hispanic, little if any Spanish-language materials exists for the automotive repair industry and those consumers who change their own motor oil. EPA hopes to fill this void through a wide-scale distribution of these materials, which include posters, brochures and bumper stickers. These materials are available to download from the EAP Web site. (5)

The recycled used motor oil is used for many purposes. Reprocessing is the most common method of recycling used oil in the United States. Seventy-five percent of used oil is being reprocessed and marketed to asphalt plants, industrial boilers, utility boilers, steel mills, and others. Fourteen percent of used oil collected is turned over to re-refiners who return used oil to its original virgin oil state. Eleven percent of used motor oil collected is used in specially designed space heaters in automotive bays and municipal garages. (4)



Lynn Cooke, a service station owner in Washington, D.C., demonstrates quality control measures for used motor oil recycling to representatives from EPA, District of Columbia, and API.

(American Petroleum Institute Web site: www.recycleoil.org [4])

b. Dumping into Storm Drains

Storm drains carry stormwater runoff from streets (see the Water Resources chapter of this report). This water is not treated and goes directly into local streams. All streams in Fairfax County eventually flow into the Potomac River, which empties into the Chesapeake Bay. Anything dumped down a storm drain will follow the same path as the stormwater runoff. (6)

The cleaning up of animal wastes and the disposal of such wastes down storm drains, as well as the disposal of leaves down the storm drains, are attempts at doing a service that have the effect of introducing pollutants directly into county streams. There are deliberate disposals of chemicals, oils, and other items into the storm drains as “out-of-site, out-of-mind.” In either situation, there is a misperception that the storm drains are part of the county sewage system and that the disposal of materials down these drains does not provide a direct impact to the environment.

4. Pipelines

The following was reported by the Fairfax Joint Local Emergency Planning Committee:

“More than 3,000 companies operate some 1.9 million miles of natural gas and hazardous liquid pipelines in the United States. The pipeline network includes 302,000 miles of natural gas transmission pipelines operated by 1,220 firms, and 155,000 miles are hazardous liquid transmission pipelines operated by 220 outfits. In addition to transmission pipelines, 94 liquefied natural gas facilities operate in the United States.”

Pipelines traverse Fairfax County carrying refined petroleum for two companies and natural gas for three companies. The Office of Pipeline Safety in the U.S. Department of Transportation regulates pipeline design and the construction, operation, and maintenance of pipelines to ensure safe transportation of hazardous liquids and natural gas. (7)

5. Rail Transport of Hazardous Materials

Chemicals and materials that are hazardous have regularly been transported by rail. Accidents or leaks have been, and continue to be, a cause for concern. Additional concerns have been introduced as a result of the September 11, 2001 terror attacks.

Potential future shipments of nuclear radioactive waste by rail (and by truck) will travel through parts of the Washington, D.C. metropolitan area. Should an accidental or intentional incident occur, the effects and impacts could extend beyond that initial area.

The July 18, 2001 CSX Train fire in a Baltimore, Maryland tunnel was an unintended incident involving a train car with hazardous materials and had wide-range, long-term consequences. Major sections of the downtown were closed, businesses were impacted, Orioles' games had to be rescheduled, and portions of a major street were closed for five weeks. (7)

Rail through Fairfax County is in the eastern and southern portions of the county and does not include tunnels. Residents are generally not located as close to the rails in Fairfax County as in other jurisdictions. However, some hazardous materials, alone or in combination, when released can affect areas up to miles from the initial site of the incident. It is conceivable that Fairfax County residents could be impacted with hazardous materials from a rail incident in another jurisdiction.

B. PROGRAMS, PROJECTS, AND ANALYSES

1. Fairfax Joint Local Emergency Planning Committee (FJLEPC)

Local Emergency Planning Committees are required by Section 301[c] of Title III of the Emergency Planning and Community Right-to-Know Act (EPCRA), a freestanding provision of the Superfund Amendments and Reauthorization Act of 1986 (SARA). The main thrust of SARA is to identify and clean up waste sites that are potentially toxic. Title III has two important provisions: 1) it provides for emergency response planning to cope with the accidental release of toxic chemicals into the air, land, and water; and 2) the community right-to-know provisions of Title III help to increase the public's knowledge and access to information on the presence of hazardous chemicals in their communities and releases of these chemicals into the environment. Under Title III, states are required to organize into planning areas and to establish local Emergency Planning Committees.

The FJLEPC is comprised of representatives of the City of Fairfax, the County of Fairfax, the Town of Herndon, and the Town of Vienna. Committee members include local government officials, police, fire and rescue officials, environmental and governmental planners, public health professionals, hospital officials, public utility and transportation officials, representatives of business organizations, professional societies, civic organizations, and the media. These representatives meet six times per year. The FJLEPC: (1) collects information about hazardous materials; (2) develops and updates, on an annual basis, the Hazardous Materials Emergency Response Plan (Plan); and (3) provides information to the public about the use, storage, and manufacture of hazardous materials. The Plan also contains notification procedures in the event of an incident, on site means of detecting incidents, evacuation routes, clean-up resources, and identification of parties responsible for the site. The Annual Plan

exercise was conducted at one of the participating business's location in October 2003. (2)

FJLEPC provides education and outreach to the public. Information is disseminated through public meetings, brochures, newsletters, and a Web site: <http://www.lepcfairfax.org>. The newsletter, which is mailed to civic and homeowner associations, focuses on emergency preparedness, disaster planning, and fireworks safety. FJLEPC produced a video about shelter in place. The video is available through any of the Fairfax County public libraries as well as online through the county's "video on demand" service at www.fairfaxcounty.gov/cable/channel16/vod.htm. (8) LEPC members are available to speak to businesses or citizens groups, as requested.

2. Railroad Transportation Plan

The CSX Transportation, Hazardous Material Systems, has a hazardous material emergency response plan. A written copy of that plan is on file with FJLEPC and the Fairfax County Fire & Rescue Hazmat Station 34. The Web site for CSX is: www.csx.com.

On the Web site, CSX reports a 50% increase in all of its hazardous material loads in the last decade. Of the 518,000 hazardous materials rail cars in 2004, CSX reports only nine released any portion of their contents as a result of derailments. (9) There was no mention if there were releases not resulting from derailments.

3. Storm Drain Stenciling Program

The Northern Virginia Soil and Water Conservation District (NVSWCD) has a Storm Drain Stenciling Program that encourages youth and community groups to educate the public about the dangers of dumping anything into storm drains. This is a two-part program that includes education and stenciling of the drains. The mandatory educational component must be completed prior to stenciling, and includes distributing flyers to all homes in the neighborhood regarding how to properly dispose of household and pet waste, yard debris, and used motor oil. Trained volunteers then stencil "Dumping Pollutes – Drains to Stream" on storm water inlets in pre-approved (Virginia Department of Transportation--VDOT) areas. This program has proven to be an effective, low-cost method of educating large segments of the population about water quality problems in our streams, lakes, rivers, and bay.

NVSWCD has approximately 160 pages on its Web site (www.fairfaxcounty.gov/nvswcd) and reports statistics for monthly visits to these pages. In its Biennial Report, NVSWCD listed the top 20 Web pages for the month of May in 2003 and 2004. The Storm Drain Stenciling page was

reported both times in the top 20 pages visited and saw an increase of visits in 2004 over 2003. (6)



Pictures of storm drain stenciling by local volunteers from NVSWCD Web site: www.fairfaxcounty.gov/nvswcd (6)

4. Household Hazardous Waste Program (HHW)

Fairfax County operates two HHW programs, one at the I-66 Transfer Station and the other at the I-95 Complex as a part of its recycling program for residents of Fairfax County. Hours of operation have expanded to allow residents better access to these disposal services. Information on the locations, hours of operations, types of wastes accepted, and how to dispose of the wastes is located on the county's Web site at www.fairfaxcounty.gov/dpwes/trash/disphhw.htm or by calling 703-324-5068. The expanded hours (10) are:

I-66 TRANSFER STATION

Thursday: 1:00 p.m. – 5:00 p.m.
Friday: 8:00 a.m. – Noon
Saturday: 8:00 a.m. – 4:00 p.m.
Sunday: 9:00 a.m. – 4:00 p.m.

I-95 LANDFILL

Thursday: 8:00 a.m. – Noon
Friday: 1:00 p.m. – 5:00 p.m.
Saturday: 8:00 a.m. – 4:00 p.m.

The HHW program has an overall community benefit, and therefore residents are not charged for disposal costs. The program receives its funding from the General Fund.

Household hazardous waste amounts will continue to increase as the population does. Capacity is available at the existing facilities to meet the county's needs well into the future.

In FY 2005, 22,866 users participated in the HHW program, disposing of 411,315 pounds of HHW, an 18.7% increase in usage and a 9.2% increase in the amount of HHW disposed compared with FY 2004. Additionally, the users disposed/recycled 5,790 gallons of antifreeze, 54,795 gallons of motor oil, 211,684 gallons of lead latex paint and acid batteries. Program details are provided in Table V-1 below (11, 12).

TABLE V-1
Fairfax County Household Hazardous Waste Program:
Record of Fiscal Year Disposal

Fiscal Year	Participation (# of users)	HHW (pounds)	Cost per household
FY 2005	22,866 households	411,315	\$18.84
FY 2004	18,600 households	373,220	\$22.92
FY 2003	16,140 households	359,840	\$23.30
FY 2002	16,272 households	368,060	\$20.97
FY 2001	15,312 households	356,275	\$18.75
FY 2000	15,564 households	330,325	\$18.33
FY 1999	15,222 households	396,019	\$20.06
FY 1998	15,519 households	387,020	\$24.28
FY 1997	13,219 households	397,266	\$29.41
FY 1996	11,010 households	369,710	\$34.58
FY 1995	11,066 households	246,138	\$27.86
FY 1994	8,741 households	214,770	\$41.57

Source: Fairfax County Department of Public Works and Environmental Services, Division of Waste Disposal and Resource Recovery

5. Commercial Hazardous Wastes

Fairfax County hosts several Business Hazardous Waste Clean-Up Days annually. Only Fairfax County businesses that are Conditionally Exempt Small Quantity Generators (CESQGs) may participate. A CESQG is a business that either generates less than 100 kilograms (about 220 pounds or 27 gallons) of hazardous waste per calendar month or produces less than one kilogram (about 2.2 pounds or ¼ of a gallon) of acutely hazardous waste per calendar month. For more information, call 703-324-5230, TTY 711, or view an online brochure in PDF format on the county's Web site:
www.fairfaxcounty.gov/dpwes/trash/disphazcomm.htm . (13)

6. Recycling Rechargeable Batteries

Fairfax County collects batteries for recycling at the HHW facilities. Mercury and lithium batteries are the only non-rechargeable household batteries accepted by this program. Other batteries may be safely thrown away (10). The county also has started to collect Nickel-Cadmium (NiCad) and other rechargeable batteries at both HHW locations. Information, including hours of operations, can be found at:
www.fairfaxcounty.gov/dpwes/trash/recyclingtrash.disphhw.htm .

Rechargeable batteries are commonly found in cordless power tools, cellular and cordless phones, laptop computers, camcorders, digital cameras, and remote

control toys. Rechargeable Battery Recycling Corporation (RBRC) is an organization funded by the recyclable battery manufacturers in the US for the purpose of collecting used rechargeable batteries for recycling. RBRC works with retail outlets that sell these types of batteries to collect the used batteries when customers bring them in to purchase new ones. There are a number of retail outlets in Fairfax County where rechargeable batteries are collected for recycling. (14)

RBRC recycles the following battery chemistries: NiCad, Nickel Metal Hydride (Ni-MH), Lithium Ion (Li-ion), and Small Sealed Lead (Pb) weighing less than two pounds. Battery Recycling seals can be found on the batteries. Additional information on what happens to the batteries, collections sites, and “handy tips for using, storing, and recharging your rechargeable batteries” can be found on the Web site: www.rbrc.org. (15)

The Fairfax County Solid Waste Management Plan (SWMP) discussed this issue in its chapter on “Special Wastes.” It projected an increase of 109 tons per year of batteries by 2025. The SWMP recommended promoting public/private recycling programs to increase special wastes recycling, including NiCad battery recycling. (16) With the increasing appetite for cellular phones and cordless products using rechargeable batteries, this will be an important recycling issue in Fairfax County for the foreseeable future.

C. REPORTING ENVIRONMENTAL CONCERNS AND ISSUES

Environmental issues affect everyone living and working in the county. All environmental concerns and events negatively impacting the county should be reported. A list of contact information relating to environmental crimes is provided in Table V-2 below.

D. LEGISLATIVE UPDATE

No report of legislative or regulatory changes regarding hazardous materials issues in 2005 and implications to Fairfax County. (1)

Table V-2 <u>HOW TO REPORT ENVIRONMENTAL CRIMES</u>	
<u>Type of Incident</u>	<u>Phone Number</u>
<u>ANY ACTIVE RELEASE OF MATERIALS INTO THE ENVIRONMENT</u> <p>If the dumping of any substance into a stream, into a manhole, into a storm sewer, or onto the ground is witnessed, assumptions regarding the contents of the materials should not be made. 911 should be called immediately. When calling 911, be prepared to provide specific information regarding the location and nature of the incident. The local office of the U.S. Environmental Protection Agency (703-235-1113) can be called in addition to (but not instead of) 911.</p>	911
<u>HAZARDOUS MATERIALS-DANGEROUS</u> <p>If a suspected hazardous substance is being released, if lives are in danger, or if property is threatened, 911 should be called immediately. It is also appropriate to call 911 anytime an active release is witnessed.</p>	911
<u>HAZARDOUS MATERIALS-NO IMMEDIATE DANGER</u> <p>If a known discharge of hazardous materials has occurred in the past and no lives or property are in immediate danger; this must be reported to the Fairfax County Fire and Rescue Department's Hazardous Materials and Investigative Services Section at this number (includes Towns of Clifton, Herndon, and Vienna). If there is any question about whether a release may still be active or whether there may be any immediate danger, 911 should be called.</p>	<p>During working hours, call: 703-246-4386</p> <p>After hours, call: 703-691-2131</p>
<u>RELEASE OF ANY MATERIAL INTO THE ENVIRONMENT</u> <p>Any release of materials into the environment, whether hazardous or not, should be reported to the Northern Regional Office of the Virginia Department of Environmental Quality at the above number. If the release is an active one, call 911.</p>	703-583-3800

Table V-2 (continued)	
<u>HOW TO REPORT ENVIRONMENTAL CRIMES</u>	
<u>Type of Incident</u>	<u>Phone Number</u>
<u>EROSION AND SEDIMENTATION</u> If the illegal removal of trees, the illegal clearing of land, and/or the illegal dumping of fill is suspected, contact Fairfax County's Code Enforcement Division at this number. This number should also be contacted if siltation and other harmful effects of construction activity are occurring or observed on neighboring lands and waterways. All calls received during non-working hours will be responded to during the next business day.	703-324-1937
<u>HEALTH HAZARDS</u> In addition to the above contacts, if a health hazard is suspected, contact the Environmental Health Administration at this number. The Health Department's Community Health and Safety Section (703-246-2300) can also be called. Asbestos-specific releases should also be reported to the Health Department.	703-246-2205

E. RECOMMENDATIONS

1. EQAC continues to recommend an aggressive public education campaign on how to properly dispose of household/residential, commercial, and industrial hazardous waste. Continuous partnering with the Northern Virginia Board of Realtors and solid waste haulers to distribute information to all new residents in the county is suggested. New residents would be anybody buying or renting a house, townhouse, or condominium. Waste removal companies could be asked to include an information letter with their mailings to their customers. Creative use of other organizations is also encouraged.
2. EQAC recognizes the County's ability to collect rechargeable batteries at the I-66 transfer station, the I-95 SW site, and special programs with the business community. Schools and other organizations should be encouraged to come up with creative initiatives to promote significant increases in recycling rechargeable batteries. Possible sites to house recycling drop off bins should be explored, such as outlying areas of parking lots. With the growing popularity and use of rechargeable battery products, especially cellular phones, EQAC recommends an aggressive program to promote recycling of NiCad rechargeable batteries.

3. EQAC recommends continuing to advertise and educate the public regarding the types of hazardous materials and other environmental situations citizens are requested to report, including whom they are to contact. Possible avenues are community association newsletters, press release stories to the media, and age appropriate material sent home through the schools. Avenues that are not connected with environmental information should be explored to reach people not drawn to environmental events.

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16. Solid Waste Management Task Force Plan, 2005, last modified 27 August 2004, as viewed on-line 23 September 2004; www.fairfaxcounty.gov/dpwes
17. Previous EQAC authors of this chapter and material

ANNUAL REPORT ON THE ENVIRONMENT

CHAPTER VI

**ECOLOGICAL
RESOURCES**

VI. ECOLOGICAL RESOURCES

This chapter summarizes the status of ecological resources and the actions of public agencies and citizen groups in the management and preservation of these resources.

A. ISSUES AND OVERVIEW

Open space and natural habitat continue to be reduced in Fairfax County, primarily because of development (both residential housing and commercial buildings) and road building. As this resource is reduced, increased emphasis must be placed on protecting, preserving, and enhancing the remaining open space and natural habitat in Fairfax County.

Fairfax County contains a total of about 227,750 acres. Of this total, about 28,108 acres (12.3%) are in parks and recreation as of January 2004. Another approximately 25,712 acres (11.3%) are vacant or in natural uses. This compares to the about 26,700 acres (11.7%) that were vacant or in natural uses as of January 2003. However, not all this acreage can be considered as open space that is valuable for natural habitat. First, the park acreage consists of active recreation (ball fields, etc.) as well as passive recreation (stream valley parks, nature centers, etc.) Ball fields, while greatly needed in Fairfax County, do not do much for protecting natural habitat. In a like fashion, much private open space consists of mowed areas and isolated trees (not woodlands). Again, this does little for protecting natural habitat. Both active recreation areas and private open space, however, if properly designed can help the environment by reducing storm water runoff (by allowing storm water to infiltrate into the soil).

Second, while vacant land is often wooded, this land is subject to development. Considering the continuing rapid pace of development in Fairfax County, much of this land will soon become residential space, office space, retail space, etc., and not provide much in the way of protecting natural habitat. In 1980, vacant land accounted for 32.2% of the total land in Fairfax County. By 1990, this had dropped to 19.5% and the figure was 11.3% as of January 2004.

Therefore, Fairfax County needs to undertake stronger efforts in order to protect, preserve, and enhance the environmentally sensitive open space in the County. These efforts should include the establishment of a Countywide Natural Resource Inventory, followed by a Countywide Natural Resource Management Plan. Additionally, the County needs an aggressive program seeking easements on privately owned environmentally sensitive land and, as opportunities arise, to purchase environmentally sensitive land.

Two significant efforts have occurred that should help in the County's preservation and protection of natural resources. First, as reported in last year's Annual Report on the Environment, the Fairfax County Board of Supervisors adopted an environmental vision for Fairfax County – *Environmental Excellence for Fairfax County: a 20-Year Vision*. This vision cuts across all activities in Fairfax County and outlines guidelines that hopefully will be followed in future planning and zoning activities in Fairfax County.

Second, as reported in last year's Annual Report on the Environment, the Park Authority approved the Natural Resource Management Plan for park properties. Again, if this plan is implemented, improved preservation and protection of environmentally sensitive land should be the result.

EQAC continues to commend a number of organizations for their activities in protection, preservation, and enhancement of environmentally sensitive areas. These organizations include: the Northern Virginia Soil and Water Conservation District, the Virginia Department of Forestry, the Northern Virginia Conservation Trust, Fairfax ReLeaf, and the Fairfax County Park Authority and its staff.

B. PROGRAMS, PROJECTS, AND ANALYSES

1. The Fairfax County Board of Supervisors.

In past years, this chapter of the Annual Report mentioned various organizations and programs supporting environmental efforts in Fairfax County. However, the Fairfax County Board of Supervisors, while mentioned many times, did not have a section in this chapter. The actions and decisions of the Fairfax County Board of Supervisors (BOS) do affect the County's natural resources. These actions and decisions include land use planning and zoning, transportation planning, allocation of staff resources, etc. The BOS has enacted a number of policies that do benefit the environment and many of these policies are embedded in County ordinances and the Policy Plan. However, there never has been an overarching vision dealing with the environment. This has now changed. As reported in last year's Annual Report on the Environment, the BOS has now adopted such an overarching vision -- *Environmental Excellence for Fairfax County: a 20-Year Vision*.

This vision is organized into six sections that cut across all areas in the County:

- Growth and Land Use;
- Air Quality and Transportation;
- Water Quality;

- Solid Waste;
- Parks, Trails, and Open Space; and
- Environmental Stewardship.

Some recommendation in this document that impact ecological resources include:

- Create more community parks for active and passive recreation – open spaces with native vegetation to sustain local wildlife and to create areas for walking, meditating, or bird watching;
- Continue to acquire open space before it is too late through direct purchase or conservation easements to create more trails, connect trails and provide passive and active recreation areas;
- Provide adequate resources to maintain and appropriately develop our parks for passive and active recreation;
- Encourage conservation easements for open space and trails either to private organizations, such as the Northern Virginia Conservation Trust and The Potomac Conservancy, or to government agencies like the Fairfax County Park Authority or the Northern Virginia Regional Park Authority;
- Encourage organizations, for example, those that work on stream monitoring and stream valley restoration, to involve schools and citizens of all ages in their work;
- Encourage citizen-based watershed stewardship groups and help them to work with all stakeholders to protect, enhance and improve the natural resources, and hence, the quality of life in their watersheds; and
- Establish an aggressive program of community groups to adopt natural areas such as parks, trails, and stream valleys.

The summary of the document can be viewed at: http://www.co.fairfax.va.us/dpwes/environmental/env_excel.htm and the complete document is at: http://www.co.fairfax.va.us/chairman/environmental_plan.htm

This document is very significant in its potential for protection, preservation, and restoration of the County's natural resources. EQAC continues to commend the Board of Supervisors for adopting this vision and for the steps it is taking to implement these recommendations.

2. Fairfax County Park Authority

The Fairfax County Board of Supervisors created the Fairfax County Park Authority (FCPA) in 1950, authorizing the Park Authority Board to make decisions concerning land acquisition, park development, and operations. As a result, Fairfax County has a system of parks that serve a number of uses, including active recreation such as sports, historic sites and buildings, and

preserving environmentally sensitive areas such as forests and stream valley lands. For current information on the County's parks, visit the FCPA website at <http://www.fairfaxcounty.gov/parks/>.

Acquisition of Park Land by FCPA

The FCPA added nearly 566 acres in 2004 through a combination of purchases, dedications, transfers, and donations. This brings the parkland inventory to a total of 23,517 acres. The largest portion of the added property was a transfer of 505.4 acres from the Board of Supervisors on November 5, 2004. Table VI-1 lists all the properties acquired.

Natural Resource Management Plan

In past reports, EQAC recommended that the County Board of Supervisors develop and implement a Countywide Natural Resource Management Plan. EQAC noted that in order to do this, two tasks need to be accomplished first: complete a Countywide Baseline Natural Resource Inventory and adopt a unified Natural Resource Conservation Policy.

EQAC's past recommendation on developing a Countywide Natural Resource Management Plan has been partially fulfilled by FCPA. On January 14, 2004, the Park Authority Board approved the Natural Resource Management Plan (NRMP) for Park Authority property. The NRMP contains seven elements:

- Natural Resource Management Planning;
- Vegetation;
- Wildlife;
- Water Resources;
- Air Quality;
- Human Impact of Parklands; and
- Education.

The complete NRMP can be viewed at
<http://www.fairfaxcounty.gov/parks/nrmp.htm>

The first year of the implementation of the NRMP was completed June 30, 2005. Some of the highlight of year one included:

- Policy
 - Begin to look at Park Authority policies and practices and how resource protection is and should be incorporated in activities.

Table VI-1 FCPA 2004 Acquisitions			
<u>Parcel(s)</u>	<u>Acreage</u>	<u>District</u>	<u>Adjacent Park or Stream</u>
PURCHASES			
Douglas S. Mackall III	3.5	Lee	Huntley Meadows Park
The Milton Company	26.8	Mason	Accotink Creek
The Milton Company	4.9	Springfield	Accotink Creek
Joanne L. Barnes	3.95	Mason	Turkeycock Run
DEDICATIONS			
Coppermine Crossing	2.9	Hunter Mill	Merrybrook Run
South Station LLC	3.8	Mount Vernon	Pohick Creek
Equity Homes LLC	8.6	Springfield	Little Rocky Run
Potomac Heritage Homes	3.9	Springfield	Pohick Creek
TRANSFERS (from BOS)			
	0.3	Braddock	Country Club View
	0.6	Dranesville	Dranesville Tavern
	15.4	Hunter Mill	Horsepen Run
	0.2	Hunter Mill	Wolftrap Stream
	12.5	Lee	Indian Run
	6.0	Lee	Accotink Creek
	27.7	Lee	Dogue Creek
	1.8	Mount Vernon	Pohick Creek
	300.9	Mount Vernon	Laurel Hill
	16.8	Mount Vernon	Laurel Hill
	105.5	Sully	Bull Run
	17.7	Sully	Bull Run
DONATIONS			
Northern Virginia Conservation Trust	0.6		Backlick Run
Allan R. Hurwitz & Allan J. Berman	1.4	Lee	Huntley Meadows

Source: Michael A. Kane, *Request for Input for Environmental Quality Advisory Council's Annual Report on the Environment, 2005 Report*, Letter to James P. Zook, Director, Department of Planning and Zoning, Fairfax County, Virginia, July 11, 2005.

- NRMP Program
 - Develop operations plan including roles and responsibilities for NRMP Section staff.
 - Plan the out-years implementation of the NRMP

- Natural Resource Inventories/Site Specific NRMPs

- Inventories will only occur as needed as a result of planned development/master plans and as funding allows
 - Site specific NRMPs will not occur for unstaffed parks
- GIS/Green Infrastructure
 - Begin to assess needs and develop a Park Authority GIS Strategy
- Stewardship Maintenance at Unstaffed Parks
 - Will not occur other than through existing staff and area crews and partnerships
- Invasives Species Management
 - Education will be the only component other than some small projects
- Education
 - An expansive Resource Stewardship Education program is planned

While the Park Authority has made a great step forward with the adoption of the NRMP, more resources (people and funds) need to be devoted to the implementation of the plan. Furthermore, inventories of all parks need to be accomplished. The inventory needs to be extended to cover all of Fairfax County so that future planning for acquisition of sensitive lands can take place.

Greenways Program

Implementation of the Greenways Program began in 1997 with the Park Authority staff working with citizens groups participating in the Parks Round Table partnership. Unfortunately, the Park Authority staff stopped supporting the Round Table and the Parks Round Table lapsed. The Greenways concept is furthered through the County Comprehensive Plan, and through Park Authority policy, to “identify, protect, and enhance an integrated network of ecologically valuable land and surface waters for present and future residents of Fairfax County.” FCPA helps accomplish this goal through the acquisition of land for Stream Valley Parks, and the development of a comprehensive trail network.

As is the case with Environmental Quality Corridors (EQCs), the ecological boundaries of Greenways may include both public and private open space. Under voluntary cooperative resource management agreements, the Park Authority could offer technical assistance for enhancing the Greenway benefits of private property. This could include the landowner voluntarily granting conservation easements. Groups such as The Nature Conservancy have used conservation easements successfully to protect environmentally sensitive lands,

and The Nature Conservancy has found that many landowners support the goal of preserving these environmentally sensitive lands.

EQAC notes that the Greenways Program is valuable in that it can expand the protection of environmentally sensitive stream valleys. However, this program should be aggressively expanded through the use of obtaining conservation easements, where possible, on private properties. As noted above, The Nature Conservancy has been successful in this approach. Additionally, the Northern Virginia Conservation Trust (NVCT) has now obtained a number of easements in Northern Virginia, showing that this approach in Fairfax County is feasible. The Board of Supervisors should continue its cooperation with NVCT and aggressively pursue easements aimed at protecting and preserving environmentally sensitive lands.

The Greenways Program did move forward in 2004 with the acquisition of about 560 acres of stream valley land in purchases, dedications, transfers, and donations. These are mentioned above under land acquisition.

Invasive Plant Control Efforts

Invasive plants are a problem because they can out-compete and replace native species. This change in vegetation disrupts the life cycles of many flora and fauna that depend on native vegetation. The Park Authority's Strategic Plan includes a strategy to develop invasive plant guidelines for consideration by the Environmental Coordinating Committee as a countywide standard. Invasives projects occur at staffed parks and in select parks when volunteers can assist in the efforts. While EQAC commends the volunteers and the Park Authority staff who are cooperating in removing invasives, an increased effort should be established using dedicated funds for this purpose.

One such project involving volunteers is the adoption of the Marie Butler Leven Preserve by a non-profit organization (Earth Sangha). Earth Sangha will demonstrate invasives removal and the use of native plants and trees at this preserve. Earth Sangha and FCPA are seeking funds for invasives removal.

Examples of invasives control projects at staffed sites include Riverbend Park and Ellanor C. Lawrence Park. Riverbend Park is continuing the partnership with the Potomac Conservancy and The Nature Conservancy that created opportunities to bring volunteers to Riverbend and Scott's Run Nature Preserve as a means of controlling invasive species. At Ellanor C. Lawrence Park, site staff continued to combat invasive exotic plants through cutting and spraying. These plants included Japanese stiltgrass, autumn olive, and oriental bittersweet.

Riparian and Bioengineering Projects

The Fairfax County Park Authority, along with and in partnership with other agencies, continues to work on stream stabilization/bioengineering projects. See the Water Resources Chapter of this report for descriptions of these projects. The stream bank stabilization projects were along Difficult Run near Georgetown Pike and a Stream Stabilization Work Day at Americana Park.

Turf Maintenance on Athletic Fields

Over-fertilization can cause problems in water quality. Too much fertilizer will end up in the County's stream. The Park Authority's turfgrass management program seeks to balance the needs for fertilizers with consideration for soil biology and runoff potential. Along this line, the cornerstones of the program are frequent soil sampling and the use of high quality natural organic fertilizers. Nutritional amendments are applied based on the soil reports. In this manner, the Park Authority has enhanced soil biology while balancing soil chemistry.

The Park Authority continued experiments with the use of various composts as top dressing. Applications of compost enhance soil biology and help flocculate tight, heavy, native soils. Enhanced soil biology and improved drainage have resulted.

Easements

Easements are another way of protecting ecological sensitive properties. A number of organizations hold easements of such properties in Fairfax County (see below). FCPA also holds approximately 25 conservation easements totaling over 150 acres. A future Annual Report on the Environment will give further details on these easements.

Other Activities

During the FY 2004 carryover review, the Board of Supervisors placed \$2.0 million in a reserve to fund projects related to the Board's Environmental Agenda. Several Park Authority resource management projects were funded with this carryover funding:

- Countywide Stewardship Education (\$135,000) – Fund education and outreach efforts on County environmental stewardship initiatives.
- Geographic Information Systems (\$180,000) – Expand the use of GIS for Park Authority natural resource management.
- Low Impact Development Demonstrations (\$150,000) – Demonstration of low impact development facilities at park sites, including innovative stormwater management practices.

- Stream Buffer Restoration (\$300, 000) – Replenish areas along stream corridors with deficient riparian vegetation buffers.
- Illegal Dump Site Removal (\$300,000) – Begin to eliminate over 95 unauthorized dumpsites within stream corridors.

Fairfax County Park Foundation

Fairfax County citizens can donate to the Fairfax County parks through the Fairfax County Park Foundation. The Fairfax County Park Foundation is a 501(c)(3) not-for-profit organization and donations are tax deductible to the fullest extent allowed by law. The Foundation's mission is to raise funds to support the parks and land under the stewardship of the Fairfax County Park Authority. Less than half of the Park Authority's annual operating funds come from tax support. The Foundation's goal is to bridge the gap between income from tax support and user fees, and the cost to operate, maintain and preserve our park system. If you are interested in giving a tax-deductible donation to the Foundation, contact them at:

Fairfax County Park Foundation
 12055 Government Center Parkway
 Fairfax, VA 22035
 (703) 324-8581
 SupportParks@aol.com
<http://www.FairfaxCountyParkFoundation.com>

3. Northern Virginia Regional Park Authority

Three Northern Virginia Counties (Fairfax, Loudoun, and Arlington) and three cities (Alexandria, Fairfax, and Falls Church) participate in the Northern Virginia Regional Park Authority (NVRPA). NVRPA was founded in 1959 and owns and operates 19 regional parks and owns 10,256 acres of land throughout the region.

The NVRPA often partners with other organizations to meet their mission of caring for the environment, overseeing urban forestland, protecting water resources, and preserving land for future generations. Some of these activities in 2004 included:

- Development of a landmark agreement with Dominion Virginia Power to set specific standards for pruning and cutting trees near the electrical transmission line along the Washington & Old Dominion (W&OD) Trail. This agreement also set stringent herbicide use standards;
- Coordination with the Virginia Tech Hampton Roads Agricultural Research and Extension Center on a W&OD Trail Revegetation Research Project;

- U.S. Bureau of Land Management “Public Lands Appreciation Day” projects at Pohick Bay and the W&OD Trail;
- Friends of the Occoquan and Chesapeake Bay Restoration Fund-sponsored Occoquan River Semi-Annual Cleanup Days at Occoquan, Fountainhead, and Bull Run Marina;
- Alice Ferguson Foundation 15th Annual Potomac Watershed Cleanup Day at Pohick Bay;
- Virginia Division of Soil and Water Conservation’s Urban Nutrient Management Program at NVRPA golf courses and athletic fields; and
- Coordinating the planting of nearly 500 native species trees by the Friends of the W&OD and 1,000 native species by Dominion Virginia Power to offset losses on the W&OD Trail during utility maintenance.

Current information about the Northern Virginia Regional Park Authority can be found on their website, <http://www.nvrpa.org/>

4. Fairfax ReLeaf

Fairfax ReLeaf is a non-profit (501(c)(3)), non-governmental organization of private volunteers who plant and preserve trees, restore forest cover, restore habitat, and improve community appearance in Northern Virginia. This organization has testified to County officials and politicians that an unacceptably rapid rate of tree loss in Fairfax County continues; the group has stated that the County has not taken effective steps to stem this loss of forest infrastructure. Fairfax ReLeaf is very active in tree plantings and is always eager to sign up new volunteers.

These tree plantings lead to a number of benefits:

- Maintenance and improvement of air quality;
- Reduced heat island effects;
- Reduction of noise;
- Preserved human and wildlife habitats;
- Reduction of energy use; and
- Reduction of surface runoff and improvement of water quality.

Fairfax ReLeaf remains very active in its efforts. For example, during 2004, the organization:

- Planted 912 trees this year by 383 volunteers providing 1,350 hours (corporate volunteer efforts amounted to 110 hours)
- Planted with the Centreville beautification committee and the Franklin Farm Open Space Committee;

- Planted at public schools, recreation centers, storm ponds, county parks, and state road rights-of-way;
- Provided the opportunity for six Eagle Scout, two Girl Scout, and one Boy Scout troop plantings;
- Planted a rain garden with children in the School Age Child Care program at Crossfield Elementary School;
- Carried out maintenance of previously planted sites;
- Spent 231 hours on invasive plant removals on six sites; and
- Conducted the following educational activities:
 - Participated in the Fairfax County Earth/Arbor day celebration, several exhibits, and in the community volunteer openhouse.
 - Conducted three workshops for planting site leaders;
 - Gave a presentation on invasive plants to the Garden Club of McLean School; and
 - Prepared a bilingual pamphlet on proper tree care for landscape workers, and distributed it to each school in Fairfax County.

Other activities included the planting of a stormwater management pond near the Dulles Toll Road in Herndon, the planting of a disturbed creek bed near the new Laurel Hill Park in Lorton, and the planting of 75 trees (live stakes) to begin the process of creating a buffer around a stormwater management pond on a golf course.

For further information on Fairfax ReLeaf, visit its Web sites at <http://www.fairfaxreleaf.org> or <http://www.geocities.com/RainForest/5663>. The organization can be reached at:

Fairfax ReLeaf
 12055 Government Center Parkway
 Suite 703
 Fairfax, VA 22035
 Telephone: (703) 324-1409
 Fax: (703) 631-2196
 Email: trees@fairfaxreleaf.org

5. Northern Virginia Conservation Trust

Past EQAC reports have recommended that the Fairfax County Board of Supervisors form public-private partnerships for the purpose of obtaining easements on environmentally sensitive land. EQAC pointed out that entities such as The Nature Conservancy use easements very successfully as a way of protecting environmentally sensitive properties. With the signing of a Memorandum of Understanding on June 20, 2001 between the Fairfax County Board of Supervisors and the Northern Virginia Conservation Trust (NVCT), such a public-private partnership now exists.

The Northern Virginia Conservation Trust (NVCT) was founded in 1994 as the Fairfax Land Preservation Trust. In 1999, this name was changed to The Northern Virginia Conservation Trust to better reflect the regional scope of the organization. NVCT is a 501(c)(3) nonprofit land trust dedicated to preserving and enhancing the natural and historic resources of Northern Virginia. NVCT also has formed public-private partnership with Arlington County and owns properties or easements in Arlington, Fairfax, Loudoun, Prince William, and Stafford Counties.

From the time NVCT accepted its first easement in 1999 through June 2004, NVCT has preserved 512 acres of open space in Fairfax County through easements, fee simple ownership, and partnerships. Between January 2004 and June 2005, NVCT has obtained the following:

- Hauge Easement, 0.75 acres in Mason District, April 2004;
- Oak Hill Easement, 2.8 acres in Braddock District, May 2004;
- Oak Run Park, fee simple ownership, 0.1 acres in Mason District, May 2005; and
- Martin/Siegel Easement, 0.3 acres in Mount Vernon District, June 2005.

NVCT continues to work toward reaching agreements on more conservation easements. Some that are possible in the future include locations in Reston, Great Falls, McLean, and Springfield.

NVCT also has a public outreach program – Adventures in Conservation – to bring hands-on volunteerism and environmental education opportunities. These activities included the planting of thousands of native trees, the removal of tons of invasive plants, birding trips, and guided hikes. NVCT recently initiated an innovative environmental and conservation education program with the acquisition of kayaks for naturalist-led kayak trips on local waters.

EQAC encourages all landowners whose property contains environmentally sensitive land such as wetlands, stream valleys, and forests to consider contacting NVCT and learning more about easements. If these landowners grant easements, they will not only protect sensitive land, but can realize some financial benefits. A perpetual easement donation that provides public benefit by permanently protecting important natural, scenic and historic resources may qualify as a Federal tax-deductible charitable donation. Under the Virginia Land Conservation Act of 1999, qualifying perpetual easements donated after January 1, 2000 may enable the owner to use a portion of the value of that gift as a state income tax credit. Fairfax County real estate taxes could also be reduced if the easement lowers the market value of the property.

Additional information on NVCT can be found on its Web site:
<http://www.nvct.org>.

6. The Nature Conservancy

The Nature Conservancy has a very successful program of obtaining easements from property owners for conservation. Their program was the inspiration for EQAC's past recommendations for Fairfax County to seek conservation easements as a measure of protecting ecological valuable property. (This recommendation led to the public/private partnership with the Northern Virginia Conservation Trust mentioned above.) The Nature Conservancy does not hold any easements in Fairfax County at present; however, it owns one preserve (the Fraser Preserve) of approximately 233 acres on the Potomac River. For further information on The Nature Conservancy, see <http://www.nature.org>.

7. The Potomac Conservancy

Other organizations also hold easements in Fairfax County. This and the following paragraphs report on these organizations. One of these is the Potomac Conservancy. The Conservancy was formed in 1993 by individuals concerned about inappropriate development, clear cutting, and other activities that were beginning to have a negative impact on the unspoiled character of the Potomac Gorge. This led to the formation of the nonprofit land trust now known as the Potomac Conservancy. The Conservancy was incorporated on August 24, 1993 in Maryland as a nonprofit corporation. The Conservancy is registered in Maryland, Virginia and West Virginia, and is an easement holder in Maryland's Conservation Reserve Enhancement Program.

The Potomac Conservancy currently holds easements of four properties in Fairfax County. These properties total 13.46 acres, with 0.14 of that being river frontage. For further information on the Potomac Conservancy, see <http://www.potomac.org>.

8. The McLean Land Conservancy

The McLean Land Conservancy (MLC) was formed to promote and foster the preservation, protection, conservation, and balanced use of the McLean area's unique natural, cultural, recreational, and historic resources. MLC's main objective is to preserve open green space.

MLC has worked to raise awareness of the value of protecting our natural resources. A healthy balance of land use will maintain and enhance the character and quality of life in McLean, as well as the economic sustainability of our region in the face of rapid build-out.

MLC is a 501(c)(3) land trust organization that was incorporated in the Commonwealth of Virginia in January 2000 and recently became a "full-

fledged” land trust in Virginia, with the ability to hold conservation easements. As a result, the conservation easements that were identified and negotiated before July 2004 were deeded to Fairfax County, but with MLC assigned as the easement monitor.

MLC has concentrated on the preservation of riparian buffers on privately owned land. Successful projects include the protection of one acre adjacent to the headwaters of Four Mile Run, important because the health of the headwaters is critical to the health of a stream, and 2.77 acres on Pimmit Run in a pristine wooded area. These two easements are held by Fairfax County but monitored by MLC.

During the last year, MLC initiated a dialog with the Department of Planning and Zoning and the County Attorney’s Office to enhance the ability of land trusts to protect environmentally sensitive areas adjacent to development sites. Unfortunately, the County’s standard easement language allows the County to disturb the land on or “near” easements, with “near” undefined. This could make conservation easements held by the County unenforceable and has caused problems in obtaining conservation easements. EQAC recommends that the easement language be changed to define “near” and therefore enhance MLC’s ability to obtain easements.

9. The National Park Service

Another holder of conservation easements in Fairfax County is the National Park Service. The Park Service holds 38 easements covering 326.67 acres. A future Annual Report on the Environment will provide more details on these easements.

10. The Virginia Outdoors Foundation

Another holder of conservation easements in Fairfax County is the Virginia Outdoors Foundation, holding six easements totaling 67.19 acres:

- American Horticultural Society, 8.15 acres;
- Burke, Henrietta McCormick-Goodhart, III, 5.25 acres;
- Burke, Henrietta McCormick-Goodhart, III, 26.67 acres;
- Winslow, Scott Matthew and Elizabeth Louise Werner, 20.47 acres;
- Trustees of the Marie W. Ridder Trust, 7.86 acres; and
- The Marc E. Leland Trust, 59.33 acres

11. Northern Virginia Soil and Water Conservation District

The Northern Virginia Soil and Water Conservation District (NVSWCD) continues to provide leadership in the area of bioengineering techniques in streambank stabilization and in the general area of erosion and stormwater control. The District works in partnerships with other agencies and organizations. For example, it has partnered with the Fairfax County Park Authority, Virginia Department of Forestry (VDOT), the Fairfax County Department of Public Works, and the Reston Association. See the Water Resources Chapter in this report for descriptions of stream stabilization/bioengineering projects for which NVSWCD has provided leadership.

All Agricultural and Forestal (A&F) Districts are required to have a conservation plan. NVSWCD develops soil and water quality conservation plans that comply with the Chesapeake Bay Preservation Act guidelines. The plans include best management practices to reduce sediment pollution from erosion, reduce excess nutrients from animal waste and fertilizers; and avoid the misuse of pesticides and herbicides. The plans also include the establishment and maintenance of vegetated riparian buffers next to all streams and other Resource Protection Areas (RPAs). Plans are updated and technical assistance is provided as needed.

NVSWCD's annual seedling program emphasizes the role of vegetation in preventing erosion, conserving energy, and decreasing and filtering stormwater runoff. Those planted in riparian areas also help to protect stream channel stability and stream water quality, as well as improving the surrounding habitat. NVSWCD's 2004 seedling program offered citizens a "sun and shade" package of 14 native tree and shrub seedlings for a small cost. Each package contained five different species. In April 2004, citizens purchased 5,600 of these seedlings.

Fairfax County Soil Survey

Fairfax County used to have soil scientists on the staff, but in a budget cut several years ago, the office was abolished. In past Annual Reports, EQAC deplored this move and recommended that soil scientist expertise be bought back to the County staff. While the Board of Supervisors did not exactly follow this recommendation, it did satisfy the intent of EQAC's recommendation by funding NVSWCD to finish the County's soil survey. The funding for this became available to NVSWCD in Fiscal Year 2004 and will continue through Fiscal Year 2007. The field surveys will be complete in 2007 and the final reports and maps will be available in 2008.

NVSWCD is working with the National Resources Conservation Service (NRCS) in accomplishing the update of the Fairfax County soil survey. The Board of Supervisors provides money to NVSWCD to hire a soil scientist who is a member of the Survey team. It also funds NRCS for its assistance

(\$110,000 per year), which consists of two NRCS soil scientists on site and soils expertise and resources from throughout the agency, including a soils data quality specialist, a digitizing unit, the National Soil Survey Lab in Nebraska, and the National Soils Information System database. NRCS matches the funds provided thereby leveraging the funds provided by the Board of Supervisors.

The Fairfax County soil survey update will modernize an existing soil survey. The update will enable the GIS system to use the soil survey information (a capability that did not exist). As a result, this update will enable planners, individuals, scientists, and anyone involved in land use planning to make smart land use decisions that will work to save money and conserve valuable natural resources.

The resulting database and maps will incorporate the new information and scientific knowledge acquired about soils in the last 30 years. However, the updated maps will not eliminate the need for site-specific surveys when construction or changes in site use occur. The maps will better describe, characterize, and define the properties of the soil components within existing delineations. The map will also show that inclusions of other soil types can exist, but will not show the extent of smaller inclusions. Site-specific surveys will be needed for this fine detail.

One new effort that is being done under the soil survey is the characterization of man-made soils (urban soils). The characteristics of urban soils can be quite different from native soils. One significant difference is the ability of water to infiltrate urban soils (much less than many native soils). Knowing where urban soils exist and the type of urban soil can be critical to stormwater control efforts that incorporate infiltration of water (rain gardens, grassy swales, etc.).

In a similar fashion, neighboring counties are updating their soil maps. Loudoun County updated its soil maps and incorporated those data into their GIS system. Loudoun County, however, recognizes that the soils map needs to be continuously updated (based on field site inspections) and has a County Soil Scientist to provide site-specific soil interpretations. In a like fashion, Fauquier County has also updated its soil survey and incorporated that data into its GIS. Fauquier County also has a County Soil Scientist Office to provide site-specific information.

The Soil Survey is progressing well and on schedule. More than half of the soils have been mapped, either updated from the original 1963 Survey or brand new mapping. More than 3,000 transect holes have been bored with a full soil pedon description down to 60 inches performed on more than 500 of the borings. The process of progressive soil mapping in the unmapped areas is done by mapping blocks of connecting areas daily so as to have consistent and more accurate soil-landscape relationships. Once the fieldwork is completed, in

late 2005, the remaining work will focus on editing and certifying what has already been accomplished. All of the soil lines from the original soil survey have been compiled. The National Soils Information System (NASIS) database legend for the county has been and will be continually updated. NASIS soil chemical and physical characteristics have been entered for many of the soils on the legend. A pilot study of man-altered soils (also known as disturbed soils) is continuing. Samples are taken from throughout the county so that laboratory soil analysis can be performed. The locations have been selected to include man-altered soils from all the unique physiographic and geologic regions of the county. This pilot project will determine whether some soil interpretations can be made about man-altered soils. A ground penetrating radar unit was used during the last week of October 2004 to investigate man-altered soils and Marine Clays using this non-invasive technology.

The NVSWCD soil scientist provides additional services to Fairfax County. He conducts infiltration studies for proposed infiltration practices, such as rain gardens, porous pavers, and underground detention. These have included: the rain garden at Yorktowne Square, the parking lot retrofit at the Providence District Supervisor's Office, the development at Tinner Hill, the plan for retrofitting low impact development (LID) practices during the redevelopment of the Occoquan Facility at the former Lorton Prison, a rain garden at Marie Butler Leven park, the retrofitting of 15 acres at St. Louis Church with LID practices, and six demonstration LID infiltration practices in county parks. Additionally, the NVSWCD staff provided soils information to consultants, developers, realtors, homeowners, and the general public, responding to 274 soil inquiries during Calendar Year 2004.

Like our neighboring counties, Fairfax County also needs to maintain expertise in soils. At present, funding for the expertise will end after Fiscal Year 2007. However, the GIS maps will need to be maintained and updated, and this cannot be done without the appropriate expertise. Furthermore, expertise will be needed to interpret site-specific surveys. Without this expertise, problems will likely develop as uses are changed on sites. In addition, detailed knowledge of soils will be critical to future stormwater control efforts as well as other activities. One just needs to look at the slope failure on the newly widened Telegraph Road to see the importance of knowing soils and their characteristics. In this case, the failure of the slope due to clay soils jeopardized houses on the top of the hill. EQAC therefore recommends that the Board of Supervisors continue to fund soil scientist expertise past Fiscal Year 2007.

12. Fairfax County Wetlands Board

If you own property on the waterfront in Fairfax County, you may need a permit before you build or make improvements on your property. These activities, known as land disturbing activities, often require a permit if done in an area that

has been identified as a tidal wetlands. Land disturbing activities include the following:

- Any construction project on or adjacent to a tidal body of water;
- Any construction project in which fill material is place in or near wetlands;
- Construction of bridges, tunnels or roads which may have an impact on wetlands, either tidal or non-tidal; or
- Projects designed to protect property adjacent to shorelines.

During 2004 no tidal wetland permit applications were sought. Consequently the Fairfax County Wetlands Board did not conduct any public hearings to consider tidal wetlands permits. However, the Wetlands Board and county staff researched and evaluated the development a Tidal Wetlands Mitigation/Compensation Policy to achieve the goal of “no net loss” of tidal wetlands. The Wetlands Board Chair expressed concern that the mitigation/compensation policy administered by Virginia Marine Resources Commission (VMRC) in conjunction with local governments in Tidewater Virginia neglects mitigation and compensation for the small, permitted tidal wetland losses, particularly those impacts which are less than 1,000 square feet. The VMRC and the Virginia Institute of Marine Science (VIMS) Policy addresses mitigation and compensation for tidal wetland impacts which exceed 1,000 square feet.

For further information, contact the Wetlands Board at:

Fairfax County Wetlands Board Staff
Department of Planning and Zoning, Planning Division
12055 Government Center Parkway, Suite 730
Fairfax, VA 22035-5504
(703) 324-1210
<http://www.co.fairfax.va.us/dpz/environment/wetlands.htm>

13. U.S. Army Corps of Engineers

During 2004, the U.S. Army Corps of Engineers issued 42 permits for dealing with nontidal wetlands. The requested impacts included 1,495 acres of wetlands and 5,458 linear feet of streams. These impacts were authorized subject to mitigation measures that addressed 1.92 acres of wetlands and 4,945 linear feet of streams. Additionally, \$317,956 was contributed to the Virginia Aquatic Resources Trust Fund.

In 2004, no permits were issued under Section 10 of the River and Harbors Act of 1899, nor were there any enforcement cases. No regulatory changes occurred in 2004 regarding wetland-permitting requirements.

A revised draft of a stream assessment methodology was prepared in April 2005. Twelve teams composed of the Corps of Engineers, Department of Environmental Quality, local government representatives, and private sector consultants were formed to field test the revision. The comments are being evaluated. Once the methodology is finalized, the Corps of Engineers will advise the public.

14. Virginia Department of Forestry

The Virginia Department of Forestry (VDOF) has provided forestry related services in Fairfax County for over 30 years. VDOF is also participating in several efforts aimed at improving riparian zones and stream bank stabilization projects. In these efforts, VDOF partnered with the Northern Virginia Soil and Water Conservation District, the Department of Public Works and Environmental Services, and the Reston Association. See the Water Resources Chapter in this report for further details. Also, see the Water Resources Chapter for details on VDOF riparian buffer reforestation efforts.

The Virginia Department of Forestry is the lead state agency to oversee the planting and recordation of forest buffers planted in the state of Virginia. In 2004, approximately 2,040 seedlings were planted along 3,000 linear feet of stream corridors under the leadership of the Virginia Department of Forestry in Fairfax County. Partners involved in these plantings were Eagle Scouts, Difficult Run Community Conservancy, Elementary School Children, private landowners, and Fairfax ReLeaf.

The Virginia Department of Forestry participates in the Fairfax County Arbor Day on the last Saturday in April each year. The County earned again, for the 21st year, the Tree City USA award. This award is given for having a planting plan, management plan, a Tree Board/Commission, and sponsoring an Arbor Day Celebration. The award is applied for by the Fairfax County Urban Forest Management Branch and given through the State Department of Forestry. Tree seedlings are distributed by VDOF to citizens attending the Arbor Day celebration. In 2004, 500 seedlings were distributed for planting by citizens in their communities.

The Virginia Department of Forestry sponsored a drop-off site in Fairfax County for the Growing Native project. This project involves the collection of tree seeds (acorns, hickory nuts, black walnuts etc.) which are transported to VDOF nurseries where the seeds are planted and seedlings are grown. Each year 500-700 seedlings are given to citizens for planting on public lands in Fairfax County.

The conservation of the forested land base in Fairfax County is a part of the VDOF plan. The Fairfax County office works closely with the Northern

Virginia Conservation Trust to review easements for the conservation of forests; four such baseline studies were performed in 2004. Also, Agricultural and Forestal District plans are reviewed by VDOF; these efforts support the management of forested land for conservation purposes. Approximately six plans are reviewed annually.

15. Virginia Department of Transportation

Unavoidable impacts to water resources within Fairfax County that occur during highway construction projects are mitigated as required by federal and state laws and regulations. The Virginia Department of Transportation (VDOT) is currently monitoring three wetland mitigation projects within Fairfax County.

- In the Dranesville District, VDOT created a wetland project along Dranesville Road near Sugarland Run to mitigate for construction impacts from the Fairfax County Parkway.
- In the Braddock District, VDOT constructed a wetlands project in 2003 near the Virginia Railway Express—Burke Station.
- In the Sully District, VDOT created a wetland at Lee Highway and Big Rocky Run.

These sites were created to mitigate unavoidable wetland impacts from construction of Fairfax County Parkway, Roberts Parkway Bridge Overpass, the Springfield Interchange, and the Route 29 Bridge replacement over Big Rocky Run. All sites are undergoing five-year monitoring as required by federal and state permits. Two years of monitoring at the Dranesville District and Sully District sites are complete and the third year of monitoring is in progress. The first year of monitoring is complete at the Braddock District site and the second year monitoring is in progress. The results for all three sites have been impressive, with each site fulfilling success criteria outlined in the water quality permits.

VDOT uses bioengineering techniques for transportation projects with associated riparian impacts. Stream restoration on a Pohick Creek tributary near Lorton Road was completed in the spring of 2004 as a part of VDOT's Richmond Highway widening project. VDOT is assessing other potential stream restoration sites within the State's right-of-way to compensate for stream impacts from road construction projects. VDOT also seeks opportunities to partner with Fairfax County agencies and private property owners on future bioengineering projects. EQAC encourages the Northern Virginia Soil and Water Conservation District and the Department of Public Works and Environmental Services to work with VDOT to identify possible stream restoration projects and to partner with VDOT in the accomplishment of the identified projects.

VDOT has included landscaping in several construction projects to enhance road improvements. Fairfax County projects include:

- Fairfax County Parkway between Fawn Ridge Lane and Walnut Branch Road (completed December 2002 and in the final year of a three-year establishment period);
- Ox Road between Burke Lake Road and Davis Drive (completed April 2004 and under a three-year establishment period);
- Dulles Toll Road/Spring Hill Road Plaza improvements (completed January 2005 and under a one-year establishment period);
- Gambrill Road Park and Ride Lot (completed June 2005 and under a two-year establishment period);
- Richmond Highway widening from Lorton Road to Telegraph Road (construction underway as of June 2004);
- Lorton Road between Richmond Highway and Silverbrook Road (construction underway); and
- Woodrow Wilson Bridge Project Route 611/Richmond Highway Interchanges (landscape design with pedestrian/bike access improvement through these interchanges under development).

VDOT maintains about 22 acres of flowering bulbs, wildflowers, and native grasses planted throughout Fairfax County. These areas are reseeded and controlled for weed invasion as needed throughout the growing season. An additional 4,845 perennials were planted in the Seven Corners area in the median west of the Route 7 overpass.

VDOT is moving forward with efforts to control invasive vegetation along interstate and primary routes in Fairfax County. When satisfactory control is achieved at these locations, potential candidate reforestation and wildflower/native grass planting projects will be identified for 2006. EQAC continues to commend VDOT on the invasive plant removal and replacement effort and recommends that VDOT use only native species for replacement plantings.

16. Urban Forestry

a. Urban Forest Management Branch

In 2004, Urban Forest Management (UFM) continued to implement its 5-year Strategic Plan. Emphasis was placed on the following goals from the UFM Strategic Plan:

1. Develop and implement an urban forest management plan that is ecosystem-based and addresses community values.
 - With assistance from botanists from Virginia Natural Heritage Program, UFM was able to identify all of the known forest and woodland communities (30) that occur in Northern Virginia. Furthermore these communities were categorized using the National Vegetation Classification System. This information defines the total number of customized forest management plans that will need to be included in the comprehensive or countywide urban forest management plans.
2. Lead in the development of effective urban forestry policies and regulations.
 - In conjunction with legislative program staff from the Office of the County Executive, UFM prepared a proposed resolution for consideration by the 2005 Virginia Legislative Assembly. The proposed resolution directed the Virginia Department of Environmental Quality to study the feasibility of including tree-related measures in Virginia's air quality management plans (a.k.a. State Implementation Plans, or SIPs) and if these measures could receive credits as voluntary stationary source emission reduction programs under section 110 of the Federal Clean Air Act. The proposed resolution was patronized by State Senator Mims as SJ 343, but was left in the Senate Rules Committee because of anticipated budgetary impacts. However, the resolution generated considerable interest and raised awareness levels within Virginia State governmental circles. The increased awareness lead the Virginia State Forester to direct Virginia Department of Forestry Staff to initiate communication with the USDA Forest Service research staff and Fairfax County's UFM to pursue the application of tree-related practices in air quality plans.
3. Provide the highest quality service for Fairfax County citizens.
 - In cooperation with the Department of Information Technology, UFM started work to replace its aging workload management database in use since 1996. A new Web-based workload tracking system was prepared and implemented in 2004. The new workload tracking system provides a more efficient and effective way of tracking and storing project documentation and will enhance UFM's ability to provide high quality customer service.

b. Forest Pest Section Update

Gypsy Moth Caterpillar

The gypsy moth was first detected in Fairfax County in 1981. To avoid the environmental, economic, and health hazards associated with this pest the Board of Supervisors enacted an Integrated Pest Management (IPM) Program to control the gypsy moth. The purpose of the program is to reduce gypsy moth populations below defoliating levels. The goal of the program is to minimize the environmental and economic impacts of the pest by limiting the amount of tree mortality and use of pesticides in the environment. The control methods considered annually are:

- **Mechanical:** the gypsy moth egg mass Search, Scrape, and Destroy Campaign and Burlap Banding for Gypsy Moth Caterpillars. These are citizen involvement programs.
- **Biological:** the release and monitoring of gypsy moth parasites and pathogens.
- **Chemical:** the aerial and ground applications of Diflubenzuron and *Bacillus thuringiensis* (Bt) on high infestations.
- **Educational:** the self-help program and lectures to civic associations and other groups.

In calendar year 2005, gypsy moth caterpillar populations increased compared to previous years. Insect populations are cyclical in nature and it is impossible to determine whether this increase is a sign that outbreak populations are imminent. Gypsy moth populations increased in 2005; however, there was no defoliation in Fairfax County and minor defoliation reported in other areas of the State of Virginia. The gypsy moth staff will continue to monitor populations in the fall of 2005, and treatment is probable in 2006.

Cankerworm

The fall cankerworm is native to the United States and feeds on a broader range of trees than the gypsy moth. Periodic outbreaks of this pest are common, especially in older declining forest stands. The area of the county that had the most severe infestations of fall cankerworm was in the Mount Vernon and Lee magisterial districts. Typically this insect will defoliate in the early spring when the trees are able to withstand the impacts and little long-term damage is expected; however, tree mortality is possible when combined with conditions that place stress on the trees, such as drought.

Nuisance to homeowners occurs when large numbers of caterpillars hang from the trees and migrate to the ground.

The Forest Pest Program conducted an aerial treatment program during the spring of 2003. Staff has monitored for adult female moths throughout the Mount Vernon and Lee Districts since January, 2001. The result of the winter 2004 – 2005 monitoring effort indicated that no aerial treatment was required in the spring of 2005.

The Forest Pest Program will monitor for fall cankerworm again this winter. It is expected that populations of this pest will be low in the near future.

Emerald Ash Borer

The emerald ash borer (*Agrilus planipennis*) is an exotic beetle from Asia and was discovered infesting ash trees in the state of Michigan in 2002. This beetle is known to attack only ash trees and can kill trees in as little as two years. After it was discovered, the United States Animal Plant Health Inspection Service (APHIS) established a quarantine around the infested area in order to contain the pest. Unfortunately, a tree nursery owner inside of the quarantine area illegally shipped infested ash trees to a nursery in Maryland. During the summer of 2003, 13 of the ash trees were planted at the Colvin Run Elementary School site (Dranesville District). These trees were removed by the Virginia Department of Agriculture and Consumer Services (VDACS) and incinerated.

The removed trees contained evidence that adult beetles had escaped into the environment. In order to prevent the beetles from becoming established in Fairfax County, APHIS and VDACS conducted an Emerald Ash Borer Eradication Program. It was ordered that all ash trees within a one-half mile radius of the school site must be removed and incinerated. This area included a total of 278 ash trees, 90 of which were on 29 privately owned properties. All tree removals were conducted in March, 2004.

On December 12, 2003, the Commissioner of VDACS added the emerald ash borer to the list of insects that can be controlled by service districts. On January 26, 2004, the Board of Supervisors directed Forest Pest Section staff to coordinate with VDACS in implementing the Emerald Ash Borer Eradication Program. Staff of the Forest Pest Program (FPP) began assisting VDACS shortly after the insect was added to the list and Board direction was given. FPP duties included surveying the area around Colvin Run Elementary for ash trees, conducting public notification meetings, preparing maps for tree removal contractors, monitoring contracted services, preparing mailings, and responding to media inquiries.

Since the trees were removed in 2004, staff has been monitoring for the presence of adult beetles. Monitoring is conducted by placing 50 “sentinel” ash trees at various areas around the school site. An additional monitoring site was established in the Fort Hunt area of Fairfax County and was in response to a suspected infestation on the Maryland side of the Potomac River. At the end of the summer, the sentinel trees will be removed and checked for life stages of the emerald ash borer. This effort would not have been possible except for the cooperation of the National Park Service.

c. Forest Conservation Section (FCS)

In 2004, the FCS continued to serve its traditional customers: citizens, builders, developers, planners, engineers, landscape architects, private arborists, and other county staff and agencies, including the Board of Supervisors (BOS), Planning Commission, Tree Commission, Environmental and Facilities Review Division (EFRD), Environmental and Facilities Inspections Division (EFID), Department of Planning and Zoning (DPZ), Office of Capital Facilities, and the School Board.

Table VI-2 summarizes the workload of the FCS based on the requests for assistance that were completed for FY 2002, 2003, and 2004. These figures demonstrate the number of requests for assistance has remained fairly constant over the last three year period. In FY 2004, requests for assistance increased from previous years for Department of Planning and Zoning (DPZ) requests. In April, 2004, the FCS and DPZ agreed to have FCS included in the initial agency routing for all zoning cases. It is anticipated that FCS will continue to spend a significant percentage of staff time on zoning cases in 2005 and subsequent years.

Table VI-2 Urban Forest Management Workload, 2002 through 2004			
Type of Assignment	Number of Completed Requests		
	2002	2003	2004
Waivers	70	67	64
Zoning Cases	187	140	191
Land Development Services (LDS)	723	736	677
Requests: Plan Review			
LDS Requests: Site Inspections	743	732	663

Other (BOS, FCPA, Other County Agencies, etc.)	611	628	610
Hazardous Trees	27	15	17
Total Complete	2,361	2,318	2,222

d. Tree Preservation Task Force

The Tree Preservation Task Force (TPTF) did not convene in 2004. On October 6, 2004 Chairman Connolly informed the Fairfax County Tree Commission that the TPTF would no longer convene, but in its place the Tree Commission should re-examine the 37 recommendations adopted by the Board of Supervisors in 1999 for pertinence and insert any unresolved issues into a comprehensive “tree action plan” that would be considered by the Board of Supervisors for inclusion into the Board’s official Environmental Policy.

e. Tree Commission

In 2004, the Tree Commission met with Chairman Connolly to discuss the relevance of trees and forest cover to the Board’s official Environmental Policy. This conversation prompted the Tree Commission to start work on a comprehensive tree action plan that is anticipated to be completed and to be considered by the Board of Supervisors for adoption and inclusion into the Board’s official Environmental Policy in 2005. The Tree Commission’s Tree Action Plan will incorporate the following major strategies:

- Commit to preserve current tree assets by fostering health and regeneration of specimen trees and urban forest.
- Enhance the legacy for future generations by increasing the quantity and quality of trees and wooded areas.
- More effectively integrate urban forestry into our planning and policy making.

In addition to participating in numerous public events such as the Fairfax County Earth Day-Arbor Day Celebration and the County’s Land Conservation Awards program, Commissioners also provided input on various land use and development proposals affecting trees and landscaping. The Commission continues to support and advocate for the passage of legislation dealing with tree preservation and the use of native and desirable landscape trees during development.

In 2004, the Commissioners continued to use their monthly meetings to research and discuss county tree and landscape issues and policy. Various speakers made presentations to the Commission.

f. Summary of Proposed/Anticipated Changes to Tree Preservation Enabling Legislation

In light of continued opposition encountered during the 2002, 2003, and 2004 Virginia State Legislative Assemblies to amend the tree replacement provisions of § 15.2-961 to include tree preservation requirements, the Board of Supervisors decided not to include a specific tree preservation proposal in the 2004 Legislative Program. However the Board did forward a supporting position for tree conservation legislation as part of the 2004 Legislative Program.

Past recommendations made by the Tree Preservation Task Force, the New Millennium Occoquan Watershed Task Force, the Tree Commission, and the Environmental Quality Advisory Council, coupled with certainty that the County's efforts to protect air, water, soil, and wildlife resources will be extremely difficult without concurrently protecting trees and forest cover, virtually ensures that Fairfax County will continue to support tree preservation legislation.

g. Status of grant proposal for satellite mapping of the County's tree cover and analysis of tree cover data

In 2004, Urban Forest Management continued efforts to devise a countywide map for use as a layer on the County's geographic information system that will delineate the distribution of naturally occurring and landscaped vegetation, using the National Vegetation Classification System (NVCS).

In 2004, Urban Forest Management accomplished the following goals towards the mapping and identification of natural vegetation communities that exist in Northern Virginia using the National Vegetation Classification System:

- Shared vegetation sampling data with the Virginia Natural Heritage Program which provided refined and more comprehensive information about vegetation communities that exist in Northern Virginia.
- UFM started using the National Vegetation Classification System to describe vegetation communities in land use cases.

Once Fairfax County is mapped using the National Vegetation Classification System, a vegetation map will be produced for each of the County's 30 major watersheds. These data should provide a valuable benchmark that can be used to formulate and evaluate the effectiveness of watershed management and vegetation management policies. It is

anticipated that Urban Forest Management will need to continue this mapping effort into 2005.

17. Agricultural and Forestal Districts

Landowners may apply to place their land in special Agricultural and Forestal (A&F) Districts that are taxed at reduced rates. A&F Districts, which are created by the Commonwealth of Virginia, must have 200 or more acres. A&F Districts of local significance, governed by the Fairfax County A&F District Ordinance, must have at least 20 acres and must be kept in this status for a minimum of eight years.

Fairfax County's policy is to conserve and protect and to encourage the development and improvement of its important agricultural and forest lands for the production of food and other agricultural and forest products. It is also Fairfax County's policy to conserve and protect agricultural and forest lands as valued natural and ecological resources that provide essential open spaces for clean air sheds, watershed protection, wildlife habitat, aesthetic quality, and other environmental purposes. The purpose of the Local Agricultural and Forestal District program is to provide a means by which Fairfax County may protect and enhance agricultural and forest lands of local significance as a viable segment of the Fairfax County economy and as an important economic and environmental resource. All district owners agree to no intensification of the use of their land for the life of the district.

Between May, 2004 and August, 2005, the number of Local Districts increased from 40 to 41 and the number of Statewide Districts remained at two, for a total of 43 A&F districts as of August, 2005. All these districts are in four of Fairfax County's Magisterial Districts: Dranesville, Mount Vernon, Springfield, and Sully. However, acreage in Local Districts decreased from 2,052.95 to 2,046.09. The acreage in Statewide Districts remained constant at 758.64 acres. The total acreage in A&F districts decreased from 2,811.59 to 2,804.73.

The change in acreage despite a gain of one in the total number of districts was due to:

- Loss of 31.55 acres through the withdrawal of the Bonnie Foster District in Dranesville Magisterial District;
- Gain of 20.3 acres through the creation of the Koster District in Springfield Magisterial District;
- Gain of 20.02 acres through the reinstatement of the Klare District in Springfield Magisterial District;
- Loss of 15.67 acres withdrawn from the Jasper District (leaving 80.83 acres) in the Springfield Magisterial District; and
- Gain of 0.04 acres through an adjustment to the Cox District.

These actions resulted in the net loss of 4.66 acres.

18. Gunston Cove Ecological Study

Gunston Cove is a tidal freshwater embayment of the Potomac River located approximately 20 miles south of Washington, DC. The Cove is formed by the juncture of Pohick Bay and Accotink Bay, though which the waters of Pohick Creek and Accotink Creek flow to the Potomac River.

An ecological study of Gunston Cove, conducted by the Department of Environmental Science and Policy at George Mason University, and supported by the Department of Public Works, continued during 2004. This study is a continuation of work originated in 1984 at the request of the County's Environmental Quality Advisory Council and the Department of Public Works. This ongoing monitoring program was established to determine impacts from local point sources and nonpoint sources and evaluate the status of the Gunston Cove ecosystem. Information from this study is intended to form the basis for well-grounded management strategies for maintenance and improvement of water quality and biotic resources in the tidal Potomac.

The executive summary of the 2003-2004 report by Jones and Kelso summarizes details from their report and covers water quality, phytoplankton biomass, zooplankton, fish larvae and fish, and benthic organisms. The following is extracted from this summary:

Long-term trends were examined for a wide range of water quality and biological parameters. The analysis of water quality parameters focused on growing season values (June to September). In the cove, chlorophyll a, photosynthetic rate, BOD, VSS, total phosphorus, and organic nitrogen exhibited a net decrease over the study period (1983/4-2003). Nitrate nitrogen and TSS have also exhibited significant declines over the whole period of study. Ammonia nitrogen has clearly declined since 1989. These results are consistent with a significant decline in phytoplankton biomass in the cove over the study period. Phytoplankton cell densities have also declined in the past two years. Secchi disc, a measure of water clarity, has demonstrated a steady and significant increase due to lower chlorophyll a and TSS. Water clarity is improving to the point that light levels in the cove are becoming more suitable for submersed aquatic vegetation.

In the river, most indicators of phytoplankton do not exhibit a significant change over the study period. Chlorophyll a has shown a slight decline in the trend line of the past three years and phytoplankton density has declined over the past two years. However, major and substantial

decreases have been observed in all forms of nitrogen. Dissolved oxygen has also shown an increase over the study period.

All zooplankton groups in the cove and most in the river have demonstrated a significant linear increase since 1990. The cladocerans and copepod nauplii have shown the greatest rates of increase. These may indicate an improvement in the quality of algae for food and/or a decline in planktivorous fish densities.

Clupeid larvae continued to be found in high abundance in the cove. Increased values since 2000 may be due to gizzard shad. Morone larvae (white perch and striped bass) continued a multiyear decline that began in 1996.

Oligochaetes remained the most abundant benthic macroinvertebrates at both sites. Chironomids have declined somewhat in the river, but remain abundant in the cove. Amphipods have been declining in recent years in the river, while isopods have been increasing. Corbicula is having a comeback after a major dieback in the early to mid-1990s.

In the cove, trawl catches continued a decline begun in 2002 led by decreases in adult and juvenile white perch that began to decrease in 2001. For the last two years, white perch were substantially below half of the trawl collection, a condition unseen since 1990. This condition may be an actual decrease in the white perch stocks or merely a shift in their location since the population is not confined to the cove. The mean catch per trawl of blueback herring was high in 2003 while alefish was lower.

In the river, trawl catches were somewhat higher than in 2002 and above the medium value over the course of the study. White perch made up about half of the total catch, similar to recent years. Larger numbers of brown bullhead, channel catfish, tessellated darter, and hogchoker have been caught since 2000. All are known to feed on benthic animals which may have increased with dredge spoil placement.

In seine samples, the batch of banded killifish remained strong and dominated all other species. Blueback herring, alewife, and spottail shiner were caught in numbers comparable to most previous years. The abundance of white perch was very low, primarily due to fewer young-of-year in the catch. The catch of inland silverside was also low.

The occurrence of both adults and larvae in the creek was clear evidence of spawning by alewife in Pohick Creek in 2003. Alewife larvae were collected in early to mid-April in the creek just below the outfall from the Noman M. Cole Pollution Control Plant. The adults

were observed there and about a kilometer upstream as the base of a series of low waterfalls. Since 1996, either adult alewife and alosine larvae have been collected in Pohick Creek every year except 2002. Alewife adults were also observed in the creek in 2004, although identification of larvae caught there is still in progress. No blueback herring adults were caught in Pohick Creek in either 2003 or 2004 continuing the record since 1998.

Gizzard shad adults were caught in Pohick Creek in both 2003 and 2004. Larval gizzard shad were also caught in 2003, and spawning certainly occurred in the creek in 2003 and perhaps in 2004.

Water quality in Pohick Creek remains good enough to support spawning by alewife and gizzard shad.

The annual reports by George Mason University are proving to be very useful in tracking changes in Gunston Cove as a result of changes at the Pollution Control Plant. These changes at the plant have benefited the Cove. The studies should continue to get a better idea of long-term trends (as thus see the impact of changes at the Pollution Control Plant and other changes that may impact the Cove such as changes in land use in the watershed).

19. South Van Dorn Street Phase III Road Project

The U.S. Army Corps of Engineers issued a permit for the construction of South Van Dorn Phase III on May 28, 1996. Conditions contained in the permit required that no construction could start on the roadway until several conditions were completed. Three of these conditions are aimed at protecting Huntley Meadows Park.

One condition is that seven parcels of land (102 acres) adjacent to Huntley Meadows Park must be purchased by Fairfax County. This is in lieu of creating wetlands for the five acres of wetlands that will be destroyed in road construction. These 102 acres contain about 69 acres of wetlands and 33 acres of uplands. This action will ensure preservation of the wetlands contained in this 102-acre tract as well as provide a valuable addition to Huntley Meadows Park.

The County now has possession of these seven parcels of land, which will be turned over to the Fairfax County Park Authority to become part of Huntley Meadows Park. The Corps also required that this land remain natural (as is the rest of Huntley Meadows Park).

Another condition by the Corps required stormwater management improvements on eight ponds in and around Greendale Golf Course. The last

pond, at the intersection of South Van Dorn Street and King Centre Drive, was completed in June, 2002.

A third condition by the Corps required that Fairfax County submit a Monitoring and Maintenance Plan for these stormwater improvements. The plan details the monitoring and maintenance requirements for a ten-year period. The Corps approved the plan in October, 2001. The monitoring station was installed in July, 2002. The initial three years of monitoring have been completed. In lieu of further chemical monitoring, the County is proposing that further streambank stabilization improvements be constructed.

Construction of the extension of South Van Dorn Street to Telegraph Road started in September, 2002. Fairfax County provided full-time inspection of the erosion and sediment control measures during construction. Construction was completed and the roadway was opened to traffic on April 26, 2005.

C. RECOMMENDATIONS

1. EQAC recommends that the County Board of Supervisors develop and implement a Countywide Natural Resource Management Plan – an ecological resources management plan that can be implemented through the policy and administrative branches of the County government structure. Two necessary tasks should be accomplished first -- prepare and adopt a unified Natural Resource Conservation Policy, and complete a Countywide Baseline Natural Resource Inventory. EQAC notes that slow progress is being made in this area due to efforts by the Fairfax County Park Authority staff in their efforts to establish a natural resources baseline inventory. The FCPA has developed a Countywide Green Infrastructure Map that appears a basis for a Natural Resource Inventory. Additionally, the Urban Forestry Division is continuing efforts to devise a countywide map for use as a layer on the County's GIS that will delineate the distribution of naturally occurring and landscaped vegetation. However, these efforts must be supplemented by an inventory of the County that accounts for flora and fauna. The Park Authority has now prepared a Natural Resources Plan for management of the County's parks. EQAC also notes the accomplishment of the Park Authority in preparing and publishing a Natural Resources Plan for management of the County's parks and urges the Park Authority to fully implement this plan. EQAC fully supports these efforts, urging that they culminate in a Countywide Resource Management Plan. This is a continuing recommendation for past EQAC reports. EQAC's intent is that Fairfax County should have all the tools in place (the policy and the data) to create a plan that will support the active management and conservation of the County's natural resources.

2. In past Annual Reports, EQAC recommended that the County Board of Supervisors emphasize public-private partnerships that use private actions such as purchase of land and easement by existing or new land trusts to protect forests and other natural resources, including champion/historic trees. With the signing of a Memorandum of Understanding (MOU) between the Board of Supervisors and the Northern Virginia Conservation Trust, such a public-private partnership came into being. Thus, EQAC's recommendation has been satisfied. EQAC continues to commend the Board of Supervisors for this action and recommends continued support for this partnership. EQAC notes that the MOU was for a three-year period and this period is over. While the Board of Supervisors continues to fund the public-private partnership with NVCT, no new MOU has been put into place by Fairfax County. Since this interjects uncertainty into the future of this program, and the program has proved its value, EQAC recommends that an MOU covering a three-year or five-year period be put into place.

3. Despite continued opposition encountered during the 2002, 2003, and 2004 Virginia State Legislative Assemblies, EQAC continues to recommend that the Virginia State Code § 15.2-961 be amended to include tree preservation requirements. Mature trees provide a number of benefits to the environment and the quality of life in Fairfax County. These benefits include improved air quality and improved stormwater management. The value of preserving trees during the development process (versus cutting them and replacing with small plantings) is too great to give up on fighting to get tree preservation legislation.

4. Fairfax County no longer has Soil Scientist expertise on the County Staff. EQAC has in the past recommended that the Board of Supervisors reestablish this expertise. The Board of Supervisors did not establish staff positions in response to this EQAC recommendation; however, it did provide funding to the Northern Soil and Water Conservation District (NVSWCD) for mapping of the County's soils. The funding is through 2007. This enabled NVSWCD to provide the needed expertise. There is, however, a continuing need for this expertise in the County past 2007. The incident on Telegraph Road where a hillside slid into Telegraph Road and endangered homes at the crest of the hill points out the soils problems that exist in the County. The increasing urbanization of the County has created new types of soils – urban man-made soils. These soils can have different characteristics in water infiltration and erosion. Therefore, as various projects are started in these soils, including stream restoration and other water control measures, expertise in these soils are needed in the County. At present the only place this expertise exists is in NVSWCD. EQAC therefore recommends that the Board of Supervisors continue the agreement with NVSWCD past 2007 to provide soil scientist expertise.

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ANNUAL REPORT ON THE ENVIRONMENT

CHAPTER VII

**WILDLIFE
AND THE
ENVIRONMENT
IN FAIRFAX
COUNTY**

VII-1. IMPACTS OF DEER IN FAIRFAX COUNTY

A. OVERVIEW

The adverse impacts of white-tailed deer in Fairfax County are readily recognized as a problem by many of its residents. While the "problem" is seen from a variety of perspectives, there is a general consensus that the root cause is "overabundance" of deer in many local areas. There is also a general public perception that a deer management program is needed to address the "problem".

The road to an acceptable deer management solution, however, is not so easily determined. Some of the factors essential to a solution are subject to strenuous debate and attract a wide spectrum of opinion. For example, what is the optimum population level, and if population reduction is required, what means shall be used? The sport hunting community, recreational nature lovers, residential property owners, environmental preservationists, and animal rights/welfare groups have differing viewpoints on these issues.

B. BACKGROUND

1. Are Deer Overabundant in Fairfax County?

Caughly (1981) defined four contexts in which the term "overabundance" can be understood when referring to an animal species population. These definitions have since been widely used by most serious scholars in the wildlife management field and by public administrators responsible for wildlife management programs.

1. When the animals threaten human life or livelihood.
2. When the animals depress the density of, or destroy, particular favored species.
3. When the animals are too numerous for their own good.
4. When their numbers cause ecosystem dysfunction.

Where does Fairfax County stand vis-a-vis these four criteria? The available data strongly (even overwhelmingly) suggest that:

1. We experience an unacceptable number of deer-vehicle collisions resulting in deaths, injuries, and major property damage. Owners of commercial agricultural and nursery enterprises suffer substantial damage.
2. In many areas of the county, deer routinely leave their enclaves of "natural" habitat to forage in nearby gardens and yards, causing widespread damage to landscaping

and thus major economic loss to property owners. Through voracious browsing, deer are rapidly eradicating numerous threatened and endangered botanical species from the "natural" habitat. In addition, this loss of plant habitat is adversely affecting numerous vertebrate and invertebrate species of smaller physical size, such as many bird species, that are unable to compete with large herbivores.

3. Data for Fairfax County, based on Virginia Department of Game and Inland Fisheries (VDGIF) assessments spanning ten years, indicate that its various deer herds showed a single individual in excellent condition, a very few in good condition, most about evenly split between fair and poor condition, and a few emaciated individuals. This shows quite clearly that no longer can the available habitats meet the minimum nutritional requirements that would maintain the deer population in sound health. A 125-pound deer requires approximately 6.5 pounds of forage per day, or some 2,370 pounds of vegetation per year.
4. Many of our parklands and stream valleys show severe browse lines, nearly total eradication of understory, and loss of numerous species upon which the continuous process of woodland regeneration is dependent. These changes in turn lead to the inevitable loss of a wide variety of animal species. Thus, our remaining natural ecosystem is being severely deformed through the eruption of a single species that has become overdominant in the food chain.

According to each of Caughly's four criteria, it is apparent that Fairfax County has a serious overabundance of deer. In recognition of the public perception of a significant problem, the Board of Supervisors directed county staff to develop a plan for deer management. In October of 1997, county staff contracted with a consulting firm to "study and review existing data on deer, deer-habitat interactions, deer-human conflicts, and deer management proposals within the county." Staff also asked the consultants to recommend suitable methods for addressing the various problem areas. These studies and recommendations were presented in the Consultants Report (Natural Resource Consultants, December 1997). In 1998, the county created a new position and appointed a Wildlife Biologist who had broad experience with Fairfax County parks and parkland issues. In the summer of 1999, the County Executive convened an ad hoc Deer Management Committee of experts and stakeholders to discuss and evaluate the plan drawn up by the staff and the early implementation efforts. The report of this committee and its recommendations were forwarded to the Board of Supervisors in September, 1999 in advance of the season of peak deer problems, which occurs in the fall. The Board of Supervisors approved recommended measures to reduce the deer population to more sustainable and less destructive levels. Since then, the deer management program has made substantial progress in achieving significant population reductions in some of our most threatened parklands.

2. A Description of the Problem

a. Data on Deer Abundance in Fairfax County

To begin this discussion, the terms overabundance and overpopulation should be distinguished. Overabundance refers to population levels that have adverse impacts on the community and other species, while overpopulation refers to population levels of the species that are an imminent danger to itself through disease and starvation. This latter phenomenon is responsible for the population eruption and subsequent collapse of deer herds that has been a topic of scientific study for the past 60 years. While the following information supports a conclusion that deer are overabundant in Fairfax County, neither the data nor experts from a variety of sources have indicated that a level of overpopulation exists, though the relatively poor health of the county's deer suggest that we may be approaching overpopulation.

Data from the Virginia Department of Game and Inland Fisheries deer density surveys in Fairfax County parks prior to the county's deer management program showed deer densities from 90-419 deer/sq. mile (Table VII-1-1).

Table VII-1-1 Deer Density Surveys	
Location	Est. Deer/Square Mile
Huntley Meadow Park	90-114
Riverbend Park	213
Meadowlark Gardens Park	90-115
Bull Run Regional Park	419
Fort Belvoir	90
Mason Neck NWR	-

(Source: W. Dan Lovelace, Wildlife Biologist, Virginia Department of Game and Inland Fisheries.)

While the many of the data are limited, taken collectively, the observations of professional park staff, poor health of evaluated deer, and high deer densities indicate that deer are overabundant and are negatively impacting the ecology of sizeable areas

of Fairfax County. Unfortunately, there are few reliable data available for densities and extent of damage on private lands and the adjacent small islands and corridors of natural habitat. Even though the information available is primarily anecdotal, it is voluminous, and there is a general public perception of a significant and growing problem of deer overabundance.

b. Causes of Overabundance in Urban/Suburban Areas

i. Urbanization/Changes in Habitat

Over recent decades, Fairfax County has transformed from a largely agrarian and woodland area to a multifaceted employment, residential, and retail area. Over 1,000,000 people reside in the 395 square miles of the county. Of this 395 square miles, about 140 square miles is wooded and open land and some three square miles is remaining agricultural land. This change from an agrarian area to a developed one has markedly decreased the amount of land usually regarded as suitable for deer habitat and has changed their food sources and movement patterns. This urban/suburban habitat of the county provides a fairly good nutritional base for deer, including manicured lawns, athletic fields, college campuses, golf courses, and landscaped residential communities.

Overabundance is particularly common where the course of development has left protected "islands" or "corridors" of deer habitat in or near urban and suburban areas. As the development process reduces the area of natural habitat, deer are forced into these remaining islands and corridors at very high population densities. Because the deer then deplete the forage plants in these enclaves, they venture out into the surrounding developed community in search of food. In such situations, conflicts with humans frequently arise in the form of deer-vehicle collisions and depredations on gardens and ornamental plantings (Flyger et al, 1983; Cypher & Cypher, 1988). Moreover, in such situations, natural predators (e.g., wolves, bobcats, mountain lions) have normally long since been eliminated and hunting is usually prohibited.

ii. Loss of Predators

The precolonial levels of deer in Virginia could be attributed to predation by bobcats, black bears, eastern gray wolves, and eastern mountain lions, in addition to the number taken by Native American hunters. While none of these predators depended solely on deer, the deer/predator interactions and the added effects of hunters kept the population levels low and well within the carrying capacity of the land. Increasing human populations and land development has virtually eliminated wildlife predators from the county. In the first half of this century, hunting had reduced the deer population to very low levels. However in the latter half of this century, with growing human population and reduction of huntable habitats,

recreational hunting has almost disappeared in the county. While the number of deer harvested through “Out of Season Kill Permits” has increased in recent years (Table VII-1-2), the combination of seasonal hunting and out-of-season kill permits does not affect the deer population at sufficient levels to prevent significant deer/human conflicts or ecological damage.

Table VII-1-2 Out of Season Kill Permits Issued For Deer Damage in Fairfax County Virginia Department of Game and Inland Fisheries		
Year	Permits	Number Taken
1989	5	25
1990	3	4
1991	19	41
1992	18	43
1993	42	222
1994	31	131
1995	65	193
1996	165	244
1997	147	310
1998	157	297
1999	216	377
2000	197	263
2001	148	398
2002	187	249
2003	173	311

(Source: Mark Pritt and Jerry Sims, Wildlife Biologists, Virginia Department of Game and Inland Fisheries.)

It should be noted that, while the number of out-of-season permits declined markedly in 2001, the number of deer taken increased even more dramatically. A similar pattern occurred in 2003. This is quite consistent with intensification of problems in a smaller number of areas as land clearing for development squeezes the deer population into smaller and more isolated patches of habitat.

c. Problems Created by Overabundance

i. Ecological Impact

Effects of a persistent and overabundant deer population include the loss of biodiversity and a negative effect on ecological and biotic systems. These can be seen in a declining understory (lower height plants and shrubs that serve as a food source for birds) and the appearance of browse lines, which occur when deer eat almost all the vegetation within their reach and the woods develop a “line” at the top of their reach. While few detailed deer/forest impact studies have been performed in the county, in a report to the Animal Services Division, Fairfax County Police Department, the Superintendent of Administration of the Northern Virginia Regional Park Authority noted that “the ever present browse line had now become a common sight in most of our parks. The deer have eaten all of the herbaceous and woody plant growth within their reach. This has eliminated an entire stratum of habitat from the parks.”

The browse line and loss of understory are not the only indications of this ecological impact. There is an abundance of technical literature reporting the effects of a high deer population on plant communities when the lower ecosystem carrying capacity (see page 194) is exceeded. However, the apparent poor health of the county’s deer indicates a level of deer density that reportedly exceeds even the higher biological carrying capacity. There are also numerous studies documenting the negative effects of overabundant deer on wildlife species. For other vertebrates, this may occur through direct competition for food sources or more often by altering the habitat. For example, in some areas of the county, the number of species of birds has markedly diminished through loss of the necessary habitat due to excessive browsing by deer.

As noted in the 1997 Consultant Report and throughout the scientific literature, “the consequences of a persistent, overabundant deer problem can be long-term loss of biodiversity and negative impact to functioning ecological and biotic processes.” We have already begun to see a loss of biodiversity that will ultimately lead to a loss of ecosystem stability, with far more widespread and serious effects than the shorter-term effects of overabundant deer.

ii. Property Loss and Damage (Vehicular, Plantings)

There currently is no accurate system to track data regarding the total property loss due to deer/vehicle collisions. The Fairfax County Police Department does an excellent job of analysis of the data on deer-vehicle collisions that require a police presence in their aftermath or that are otherwise reported. The numbers appear to have increased, but the data (Table VII-1-3) do not show a consistent trend. For those accidents tabulated from January 1998 through 2002, the average damage per

vehicle was about \$2,300 (\$2,266 for CY 2002). Over this same period, the Virginia Department of Transportation picked up 4,507 carcasses of deer killed in vehicular collisions from rights-of-way in the county. In 2002, VDOT picked up 1,057 deer carcasses from the roadway and immediately adjacent right-of-way in Fairfax County, which represents a small increase from earlier years. This increase most likely represents normal variation from year to year.

Table VII-1-3 Deer-Vehicle Collisions in Fairfax County				
Year	Non Injury	Injury Crashes	Fatal Crashes	Total
1993	154	6	0	160
1994	149	10	0	159
1995	127	6	0	133
1996	157	20	0	177
1997	168	17	1	186
1998	144	23	0	167
1999	177	18	1	196
2000	144	17	0	161
2001	143	22	0	165
2002	122	10	0	132
2003	160	19	0	179
2004	122	14	1	137

(Source: Report prepared by Michael Uram, Fairfax County Police Department.
Report prepared by Earl Hodnett, County Wildlife Biologist.)

Police and highway experts estimate that only 20-25 percent of deer impacting vehicles die at the scene (i.e., on the road itself or in the right-of-way); many receive injuries that are soon fatal, but die in the woods or in a nearby yard. Thus, a reasonable estimate would indicate some 18,000-22,500 deer-vehicle collisions in the county during the 1998-2002 period. One can reasonably infer that many, if not most, of these collisions result in property damage to the vehicle.

County personnel report an increasing number of complaints of damage to native and ornamental plants in Fairfax County. Referring again to the "Out of Season Kill Permits Issued for Deer Damage" (Table VII-1-2), an indication is given of homeowner attempts to address property loss primarily thought to be ornamental in nature. Further, although numerous deer management programs are available, such as planting less preferred species and fencing, the effectiveness of these methods

declines dramatically with increased deer densities, leading to declining food sources and willingness of deer to eat even undesirable plants. These activities may also tend to increase vehicular incidents, as deer must look farther afield for food sources.

iii. Disease

Another problem associated with deer overabundance is the prevalence of Lyme Disease. See Section VII-3 below in this chapter for a discussion of Lyme Disease.

In addition to these crashes which required a police presence, in 2002 there were 1,057 reported deer-vehicle collisions, and in 2003 the number increased to 1,371 reported collisions.

C. ISSUES IN ADDRESSING THE PROBLEM

To effectively manage the deer population, the implications and interrelationships of population dynamics, carrying capacity, public opinion, and methods for management must be understood and incorporated into the program.

1. Understanding Population Dynamics

The concept of population dynamics is crucial to understanding the current problem and the development of a workable solution. There are no simple mathematical models that can be applied to determining the growth of the population of a species in a particular area, and the least complex deer management models and programs based on solely on nutritional deer carrying capacity (see section on carrying capacity below) consider neither the deer population's interactions with the human population nor its interactions with a biodiverse ecosystem.

One important concept to understand is that of home range. Deer show a strong attachment to a home range, and it has been shown that deer forcibly relocated often die of malnutrition even if food is accessible in their new habitats. When natural dispersal from the home range occurs, it is usually the younger males that migrate. This has four implications for Fairfax County deer management:

1. Deer often occupy a home range that can include both a park and the surrounding community or islands and corridors of "natural" habitat plus the yards and gardens of adjacent residential communities;

2. A dramatic decrease in one area will not necessarily result, in the short term, in an increased dispersal of deer from other areas into the depleted area, with a consequent lessening of population density in those other areas;
3. Deer cannot be eliminated from the county under today's conditions, because the deer surviving in surrounding home ranges will, in the long term, undergo natural dispersal and repopulate the depleted areas. This implies that parks and the surrounding areas must be managed as a unit and that solving the problem in one area does not automatically translate to another area; and
4. The recent emergence of epizootic hemorrhagic disease (EHD), a viral disease fatal to deer but posing no threat to humans, may be a significant factor in natural reduction of the deer population over the next several years. EHD has sometimes been implicated as a significant factor in the boom-bust cycle observed within deer populations that have been the subject of long-term study. Within the past year, 53 deer fatalities due to EHD have been diagnosed in the southeastern portion of the county, and these diagnosed cases probably represent only a small fraction of those succumbing to the disease. Weather, the size and compactness of deer herds, and the overall health of the deer play a major role in EHD transmission. Thus, it is not possible to predict the future course of this disease within the county, except to note that it usually takes several years to run its course within a deer population and we appear to be in the early stages of an outbreak.

Other concepts that affect population dynamics include compensatory reproductive responses, survival, and predation. Again, it must be noted that deer management is not a simple mathematical equation; it must take into account many biological and behavioral factors, many of which are not fully understood, especially in an environment such as Fairfax County. For example, in many cases, as the size of an animal population decreases, the number of offspring increases, despite the fact that food is becoming less adequate. This phenomenon leads to the population eruption-crash cycles that are widely discussed in the scientific literature. More complete data and an improved understanding of the unique characteristics of Fairfax County must be collected and considered as the management program evolves.

2. Determining Carrying Capacity Goals

Carrying capacity is the level of a population that can be supported by an ecosystem or tolerated by the community. To determine the appropriate population level as a goal for a management plan, it is essential to distinguish among the following:

1. Biological carrying capacity, i.e., a species specific level that is primarily concerned with the population that can be supported with the available nutritional resources;

2. Cultural carrying capacity, i.e., a level that is driven by human concerns (the population that can be tolerated by the community at large); and
3. Ecosystem carrying capacity, i.e., the population level that can be supported by an ecosystem without disturbance of its stability or reduction of its biodiversity.

The biological carrying capacity is a traditional view that has been widely used by fish and game departments where a primary concern is to maintain adequate stocks of deer for sport hunting, but it does not adequately account for the effects of relatively high population levels on the ecosystem in which the species resides. The cultural carrying capacity is defined by Ellingwood and Spingnesti (1986) as the maximum number of deer that can coexist compatibly with local human communities before conflicting with some human interest. This level is driven by human values, economics, and desires independent of ecological considerations. DeCalesta (1998) used the term diversity carrying capacity in a more restrictive sense than ecosystem carrying capacity, but both concepts consider the maximum species population density that does not negatively impact diversity of fauna or flora, including diversity of habitat structure as well as species richness. He contends that deer impacts on biodiversity occur at population densities well below traditional definitions of ecosystem carrying capacity.

Thus, biological carrying capacity is the highest population density and is considerably in excess of cultural carrying capacity (human societal tolerance), which in turn accepts notably higher densities than ecosystem carrying capacity. Finally, diversity carrying capacity has the smallest maximum population density.

3. Considering Public Opinion

Goals for management and methods to use to reach those goals are very different issues; consensus or conflict among groups of constituencies may occur at either or both levels. Goals may vary from a biological carrying capacity level that meets hunting concerns to a much lower carrying capacity level based on an ecological or biodiversity perspective. Cultural carrying capacity may run the gamut of levels, depending on the varying values and tolerances of different constituencies within the community. Even where there is agreement on the level of deer density desired, the methods to reach those goals may be in dispute. Some groups may have a zero-tolerance for lethal means, whereas others may readily support managed hunts or sharpshooters.

As indicated in the 1997 Consultant Report, deer control action by the county should not be undertaken until it is determined that there is sufficient community and political support for it. Again, the need for data, this time in the form of public opinion surveys, is stressed. Additionally, the need to adequately educate the public about the issues is needed to ensure well-informed constituent responses.

D. METHODS FOR DEER POPULATION MANAGEMENT

1. Population Reduction Approaches

a. Let Nature Take its Course - Eruption/Collapse

This approach is based on using no human intervention to affect the deer population one way or the other. This has been studied by wildlife biologists for more than half a century. The findings are that the population goes through an eruptive phase with explosive population growth until it is far above biological carrying capacity. This is followed by eruptions of parasitic and infectious diseases (such as EHD) and by large-scale starvation, which causes the population to crash to perhaps 15-25 percent of its peak level. Thereupon, the herd recovers to begin the cycle anew. Some populations have been followed through five or six successive cycles. Although the deer population of Fairfax County can be considered to be in the early stages of the eruptive phase, it is well short of a peak. Public concerns about the current and expected future impacts on the community rule this out as an option.

b. Lethal Methods

i. Managed Hunting

Experiences with managed hunts over the past year indicate they have been highly cost effective, in that revenue has exceeded costs for personnel and materials. This is in sharp contrast to their initial use in 1998, when costs were high and relatively few deer were taken. The dramatic upturn in the learning curve is very encouraging. Necessarily, managed hunts are conducted primarily in parkland, and while the amount of deer population reduction in these local areas is no doubt ecologically beneficial, in terms of absolute numbers it has been insufficient to make an immediate noticeable difference in the overall problem.

ii. Archery Hunting

Archery hunting has proven an effective and acceptable means of deer control in residential areas where use of firearms is deemed too hazardous. Archery is a quiet and short-range method, with most deer being taken within less than 100 feet. During the 1998 public hunting season, 789 deer were taken in Fairfax County, of which 597 were taken by archery and the remainder by shotgun. In 1999, archery accounted for 686 of the total of 1,046 deer, and in 2000 accounted for 626 of 1,028 deer. With out-of-season kill permits, archery can be used year-round, even in residential neighborhoods. In 2003, the organized Urban Archery Program harvested 119 deer and an additional 854 were taken with archery equipment by individuals.

iii. Traditional Public Hunting

Under current restrictions outlined by VDGIF, the above figures show that traditional public hunting is not sufficient to address the problem, based on hunters' limited access to deer habitat and preference for antlered deer. Moreover, the habitat that is accessible is not where the major problem areas are located.

iv. Trap and Kill

This method has usually been conducted by darting with anesthetics and dispatching the animal by gunshot or a lethal drug. The former is less effective than sharpshooters while the latter leaves the meat unfit for human consumption. The use of drop nets and stun guns is explained in the 1997 Consultant Report as a possible lethal method. This method allows for release of non-targeted males and results in meat uncontaminated by drugs but is very cost inefficient.

v. Sharpshooters

The use of professional animal control personnel, police experts, or qualified and experienced volunteers has been proved to be a safe, cost-effective, and successful means of management if lethal methods are employed. Earlier experience with this method in Fairfax County has led to significant refinements and greatly improved cost-effectiveness, with a cost per deer taken ranging from \$4.15 to \$22.97. Once again, the number of deer removed from the population by this method is not sufficient to have more than a modest local effect. The sharpshooter program has been so effective in our larger parks that vegetation has begun to recover and the focus can now shift to some of our smaller parks.

vi. Reintroduce Predators

The reintroduction of the usual species of deer predators into an urbanized setting such as Fairfax County is biologically unworkable and publicly unacceptable.

c. Nonlethal Methods

i. Trap and Relocate

Experiments with this approach have been largely unsuccessful due to high initial mortality (up to 85%) of the relocated deer. Moreover, there are few locations within a reasonable distance of this area that would accept relocated deer, since most nearby areas have similar problems. The use of drop nets and stun guns is suggested in the 1997 Consultant Report as a possible method for deer capture. More traditional methods use anesthetic darts. This method is considered infeasible for Fairfax County.

ii. Contraception

Steroidal/hormonal contraception has proved very costly and difficult to implement and only very marginally effective. Immunocontraception (where the female's immune system is stimulated so as to prevent fertilization of eggs), on the other hand, holds some promise for deer management, but it is currently in an experimental stage. The Humane Society of the United States is conducting field studies at the enclosed National Institute of Standards and Technology site in Montgomery County, but due to difficulty with marking deer, the Humane Society is not yet conducting studies for free-ranging deer such as those in Fairfax County. The recent technical literature discusses requirements for sites chosen for pilot tests. All indications are that this is not a near term solution for the county but might hold promise for limiting populations in the future, once they have been reduced to desired levels.

2. Conflict Mitigation Approaches

Conflict mitigation is directed toward reducing the direct impacts of deer on the human population and thereby increasing the tolerance of the community for the existing deer population.

a. Supplemental Feeding

Conceptually, this approach is supposed to divert deer from the landscape plantings in gardens and yards. Supplemental feeding might somewhat improve the health of the existing deer population but would almost certainly drive it to even higher levels. Thus, consideration of this approach would be counterproductive for Fairfax County, since it does nothing to reduce the excess deer population.

b. Fencing

Fencing is only rarely effective, since deer are noted for leaping even eight foot fences. Thus, fencing is a costly and ineffective solution, especially when deer are seeking out preferred plant species.

c. Repellants

In the past, repellants have had limited success; they are generally costly, and most require frequent replenishment. Also, many of them have odors that are no more acceptable to humans than they are to deer. However, one class of compounds has been used very successfully by commercial tree farms. These compounds contain denatonium benzoate and an odorant in a polymer latex emulsion which is sprayed on plants and will last for approximately three to six months and will not wash away in

rain or snow. It may be safely used on any vegetation not destined for human consumption. Readers are encouraged to contact local botanical gardens and/or major garden supply houses if they are interested in obtaining such a product.

d. Roadside Reflectors

Roadside reflectors divert light from vehicle headlights toward the sides of the roadway and are intended to frighten the deer away from the road, thereby reducing the likelihood of vehicle collisions. The method is useful in the evening and early morning hours when the majority of deer-vehicle collisions occur. While expensive, this technique has shown some promise in tests. The Virginia Department of Motor Vehicles has given the county a \$40,000 grant to conduct studies of the effectiveness of roadside reflectors. The first test site was a section of Telegraph Road that has had a high incidence of deer-vehicle collisions. The initial results show promise but are confounded by three other factors: (1) construction activity in the area may have driven many deer away; (2) a high incidence of epizootic hemorrhagic disease that may have naturally reduced the population; and (3) an archery hunting program at Fort Belvoir that definitely reduced the population in that area. The county staff has identified and begun testing at additional test sites, but these also have problems that render data interpretation extremely difficult.

e. Underpasses

Construction of underpasses has been suggested as a way of providing deer with a safe means of getting to the other side of busy roads. Not only is it exceedingly costly, but there are no data available now or expected in the future that would pinpoint likely sites. This approach is regarded as wholly impractical.

f. Use of Less-Favored Plants

Landscaping with plant species that are less favored by deer has been advocated as a way of reducing depredation of yards and gardens. However, as Cypher & Cypher (1988) and numerous other wildlife biologists have shown, when deer populations exhaust the preferred plant species, they readily turn to those less-preferred. Thus, in the short term this approach might seem to work, but longer term experience indicates that it is relatively ineffective.

E. PUBLIC EDUCATION PROGRAM NEEDS

As noted above, an educated public that has an understanding of the population dynamics of deer, the concepts of carrying capacity, the different management options, and an understanding of the various values of the community in addressing ongoing management is

essential to the successful implementation of a deer management program. The recommended public education program should encompass the following:

- The county Deer Management Web site already serves as a primary vehicle for making much of the information mentioned below more readily available and updatable. See: <http://fairfaxcounty.gov/comm/deer/deermgt.htm>
- Develop pamphlets that are easily read, easily mailed, available through various county offices and through the local Supervisors' offices. These should include information on:
 - Deer and deer biology;
 - Ecosystem and population dynamics in general, and as they relate to the interaction between deer and other species of both plants and animals;
 - Methods of population management, including their relative feasibility and cost-effectiveness for achieving both short-term and long-term goals;
 - The deer management program;
 - Permits required for implementation of private control measures;
 - Fencing and repellents;
 - Safe driving and how to avoid deer on the road;
 - Lyme disease and its prevention (See Section VII-3 of this report); and
 - Who to contact for additional information.
- Establish networking among the following agencies for provision of consistent public information:
 - Fairfax County Government offices;
 - Fairfax County Supervisors district offices;
 - Fairfax County Animal Services Division;
 - Nature Centers;
 - Health Departments;
 - State agencies, particularly Virginia Department of Game and Inland Fisheries and the Virginia Department of Transportation; and
 - The Humane Society.
- Compile and make available a comprehensive bibliography of literature on deer management in urban environments. (The references attached to this section provide a limited example.) Make this information available to schools, civic and technical groups, and interested individuals.

- Establish an archive of evidence documenting how deer can change the characteristics of a landscape. This should show:
 - Habitat characteristics before deer damage;
 - Habitat characteristics during and after deer damage;
 - Habitat characteristics during regeneration after deer population is reduced; and
 - Statistics and trends for vehicle/deer collisions, number of injuries/fatalities, and types of damage.
- Create a visual display of the above for use at schools, fairs, libraries, etc., and develop presentations for use at public meetings and meetings of civic groups.
- Establish a county self service telephone number for wildlife problems and public information. This could be a menu-driven hotline that would direct people to the proper location on the information network or to the appropriate county office.

F. PUBLIC AGENCY RESPONSIBILITY

The Animal Services Division of the Fairfax County Police Department has been assigned primary responsibility for deer management by the Board of Supervisors. However, due to the legal concept that ownership and disposition of wildlife is vested in the state, the Virginia Department of Game and Inland Fisheries exercises significant regulatory and permitting functions that affect Fairfax County's deer management activities. The Animal Services Division, in coordination with applicable land-holding agencies (e.g., Northern Virginia Regional Park Authority, Fairfax County Park Authority) and other public authorities, implements the Integrated Deer Management Plan on public lands. In addition, the Animal Services Division advises private business and residents in addressing deer management on privately owned parcels in Fairfax County. Deer management on federally owned tracts of land within Fairfax County (e.g., Mason Neck National Wildlife Refuge, Fort Belvoir, etc.) is the responsibility of the respective federal agencies and is subject to the applicable federal policies and regulations.

G. PROGRAM IMPLEMENTATION ACTIVITIES

An Integrated Deer Management Plan was developed by county staff subsequent to the Consultant Report received in December, 1997. The Board of Supervisors in November, 1998 directed that program implementation activities commence. Subsequently, in the summer of 1999, the County Executive convened a Deer Management Committee comprised of experts and various stakeholders to evaluate the plan and initial implementation efforts and to prepare recommendations for the Board of Supervisors for further implementation of the plan during the fall and winter of 1999-2000. This committee meets annually to review progress in

program implementation and to make recommendations on additional approaches. The Animal Services Division of the Police Department prepares the annual Fairfax County Deer Management Report to the Board of Supervisors that contains extensive data on the program. The county Web site <http://fairfaxcounty.gov/comm/deer/deermgt.htm> provides additional material.

On December 8, 1997, the Fairfax County Board of Supervisors approved managed hunts for Riverbend Park and the Upper Potomac Regional Park, both in the Dranesville District. Plans by the Animal Services Division were approved by the Northern Virginia Regional Park Authority and the Fairfax County Park Authority for four managed hunts for each of the two locations. The hunts were planned for January and February of 1998. The managed hunts conducted in 1998 were largely unsuccessful in achieving planned program objectives and had associated costs that were difficult to justify. However, some of these costs could be attributed to greater-than-necessary safety measures that experience now indicates would not be needed in the future. In contrast, four managed hunts, involving 132 hunters, conducted in the fall and winter of 1999-2000 were very cost effective, with 195 deer taken at a cost per animal of \$9.51. The seven managed hunts conducted in the fall and winter of 2000-2001 involved 223 hunters, who took a total of 351 deer at a cost per animal of \$17.94. Of the 351 deer taken, 222 were donated to a program that feeds needy families. For 2001-2002 hunt season, the program returned a profit of \$7.28 per animal because the permit fees collected exceeded program costs. This was also true in the 2002-2003 season, with a profit of \$79.60 per animal taken.

The sharpshooter program, which utilizes Police Department Special Operations tactical teams, has been cost-efficient from the outset. These teams must engage in extensive marksmanship training on a regular basis in order to maintain the required proficiency. Instead of practicing on a target range, they are utilizing this required training time in a field setting with the deer more closely resembling operational targets. The harvested deer are collected by a charitable organization that provides meals to the needy. Even in the early part of the learning curve, this program has shown satisfactory harvest rates. Whereas, similar programs in most mid-Atlantic jurisdictions have harvests listed in hours per deer taken, Fairfax County in 2000 had a harvest rate of 1.54 deer per hour. From late December, 1999 through late January, 2000, fourteen sharpshooting sessions over a total of 41 hours were conducted, with a total harvest of 89 deer at a cost of \$4.15 per animal. In the same period of 2000-2001, there were 23 sharpshooter sessions, totaling 94.75 man-hours, which took 146 deer, at a cost per deer taken of \$22.97. In the 2002-2003 season, the sharpshooter program took 248 deer. In 2001, the cost per animal rose to \$44.99 if all costs were attributed solely to the Deer Management Program, but this would be fallacious due to the fact that this activity represents proficiency training for the police tactical units which must be conducted anyway. A major reason for this increase in cost per animal is that most of the sites this year represented repeat visits to locations first addressed last year and the year before. As the herd population density decreases, the time expended on each animal increases, and this is further increased by the increased wariness of the surviving members of the herd. Thus, the costs are

very much in line with expectations and will drop once again as more new sites are brought into future years' mix of new and old locations.

Clearly, the managed hunt and sharpshooter programs must be conducted largely in parkland due to safety considerations, but this is also where some of the most substantial benefits are to be achieved. From the outset, the Northern Virginia Regional Park Authority has taken a position of active involvement and has reaped corresponding benefits. The Fairfax County Park Authority has more recently become actively involved and availed itself of the clear benefits offered by the program to the ecology of its parks. The FCPA reported in June, 2003 significant regeneration of the vegetative understory in two of our parks that were among the most overgrazed and have had herd reduction measures used for two successive years. This degree of success is very encouraging, and it is hoped that the FCPA will continue its active involvement in the program and thereby exercise the ecological stewardship that is so necessary to the biotic health of our parks and parkland. By mid-year 2004, the thinning of the herd in several of our larger parks had led to significant regeneration of vegetation so that the emphasis will now shift to smaller parks and those that have not yet had program activities implemented.

Out-of-season kill permits have, for some years, been one of the few legal avenues open to private property owners to permanently remove deer that are causing serious damage to their properties. Such permits are issued by the Virginia Department of Game and Inland Fisheries after verification of the damage. Generally, however, permits are only issued for holders of larger property parcels because of safety considerations. Fairfax County should work in coordination with the VDGIF to make these permits available on a wider basis to qualified residents.

Archery hunting is quite effective in suburban areas since it is much safer than the use of firearms due to the short range of the projectiles. In addition to those citizens who have the necessary skills and equipment, there are several commercial firms that offer specialized deer removal services. For the most recent year, 854 deer were harvested using archery equipment. Another 119 deer were taken under the county's Urban Archery Program. This reduction of the county's deer herd by 973 individuals demonstrates the effectiveness of archery as a tool in meeting program goals and as a method that can be safely employed in even heavily populated areas.

The use of roadside reflectors (strieter-lite technology) that reflect automobile headlights into wooded areas bordering the roadside has been suggested as a method of discouraging deer from crossing roadways in the evening and early morning hours, when most deer-vehicle collisions occur. In mid-November, 1999, the Board of Supervisors approved \$10,000 for a pilot program to test strieter-lite reflectors in selected locations. In addition, a grant of \$40,000 was received from the Virginia Department of Motor Vehicles for testing and evaluation of this technology at several locations in Fairfax County. Unfortunately, all of the test locations experienced confounding factors such as roadway modification, adjacent development, deer herd reduction through hunting and disease, etc, that made it impossible to draw reliable

inferences from the collected data. In addition, the manufacturer of the reflectors has apparently discovered that the initial design was reflecting light in a part of the spectrum to which deer's eyes are relatively insensitive, and the design is now being changed. Such inferences as can be drawn from the data suggest that there is only a slight reduction in deer-vehicle collisions due to the use of reflectors. This conclusion appears to be borne out by tests in other eastern areas where there was an absence of confounding factors. The tests in Fairfax County have shown this technology to have so little promise that it cannot be recommended for continuance.

Even though Fairfax County has not conducted a pilot project to test the feasibility of immunocontraception, this technology has shown a limited potential for the future. A program being conducted by the Humane Society of the United States on the campus of the National Institute of Standards and Technology in Montgomery County is being carefully monitored for possible applicability to Fairfax County. After the deer population has been reduced to generally acceptable levels, this methodology might provide a feasible method of sustaining these levels in some local herds for the long term. In mid-November, 2000, the Board of Supervisors approved \$10,000 to develop a pilot demonstration program on deer contraception.

H. CONCLUSIONS

The need for a comprehensive deer management program for Fairfax County is not in serious dispute. However, there is perhaps a somewhat wider array of opinion about the appropriate context for determining carrying capacity level for the management program and the particular methodologies to employ in reaching program goals.

As noted in much of the reference literature, deer have traditionally been viewed as livestock and woodlands and meadows as pasture. Deer management models and programs have been based largely upon nutritional deer carrying capacity that does not consider issues of biodiversity, altered natural processes, natural herd demographics and behavior, or adverse impacts on mankind. The discrepancy of views can be seen in comparing a report by the Virginia Department of Game and Inland Fisheries with the Consultant's Report. The VDGIF report states that deer densities ranging from 90-419 deer per square mile have been reported in various county parks and that ideal deer densities are 15-20 deer/sq. mile of suitable habitat. However, the 1997 Consultant Report and much of the scientific literature argues that a deer density of no more than 8-15 deer/sq. mile is required to meet a biodiversity goal of deer management. Many of the assumptions upon which the Integrated Deer Management Plan for Fairfax County is based require adjustment based on continued environmental assessment of the county and to meet more precisely defined ecological goals.

It is evident that, while deer in Fairfax County have not reached a state of overpopulation (as earlier defined), they are near biological carrying capacity as shown by their poor physical condition and their relentless foraging outside their "natural" habitat. It is equally evident that,

for the majority of citizens, deer have greatly exceeded cultural carrying capacity in terms of representing a serious vehicular hazard and their depredations on both private landscaping and our public parklands. There is now substantial evidence documenting the fact that ecological and biodiversity carrying capacities have long since been exceeded.

In light of the Environmental Quality Advisory Council's role as an advocate for protection of environmental quality, it is EQAC's view that a biodiversity approach is needed in Fairfax County. However, as cautioned in the 1997 Consultant Report, EQAC too cautions against attempts to move forward with a response without adequate data, a clearly articulated plan, and education and consensus building of all major stakeholders. While moving quickly may assuage the concerns of some vocal groups, a true solution must address the problem with a long-term approach, considering all major stakeholders. Management must address an ecological goal that is based on sound science and considers the value system of an educated community.

All of these caveats having been noted, the problem is of such proportions that every feasible approach must be employed not only to keep the burgeoning deer population in check, but more important, to systematically reduce it to sustainable levels. It is evident that the current managed hunt and sharpshooter programs have reached an admirable level of cost-effectiveness but are not reducing the countywide deer population at a rate sufficient to achieve the recommended biodiversity carrying capacity. Thus, it is incumbent upon the Board of Supervisors to continue to take increased and decisive action to address this problem over the long term, while recognizing that it is not going to be possible to please all of the people all of the time. It is likewise essential that the Fairfax County Park Authority continue its active participation in the deer management program in order to exercise the necessary stewardship of the ecological well-being of the county's parkland, which now constitutes nine percent of the land area of the county. The regeneration of parkland where the program has been implemented for several years shows clearly the benefits to be derived and makes it possible to schedule other parks for program activities.

I. RECOMMENDATIONS

1. EQAC recommends that the Board of Supervisors continue to implement and monitor the comprehensive deer management program set forth in the Integrated Deer Management Plan adopted in November, 1998 and refined by the County Executive's Deer Management Committee in the summer of 1999 and in subsequent periodic meetings. EQAC strongly supports the following broad goals encompassed in the plan and in the subsequent studies and evaluations:
 - Management based on reduction of local deer populations to sustainable levels.
 - Management based on a sound ecological approach that emphasizes biodiversity without preferential treatment of particular species.

- Management based on an “in perpetuity” perspective that does not trade long-term interests for short-term gains.
 - Protection, restoration, and enhancement of the natural areas and environments that have been subjected to degradation by deer overabundance.
2. EQAC strongly commends active participation of the Fairfax County Park Authority in the deer management program in order to provide enhanced stewardship of the parks, golf courses, and other parklands under its care and management. EQAC strongly endorses the joint efforts of the Park Authority and the Animal Services Division of the FCPD to take the program to parks that have not yet been served. Further, EQAC recommends that techniques be employed to concentrate deer in the safest parts of smaller parks when using sharpshooters in order to maximize safety for surrounding neighborhoods.
 3. EQAC believes that, while some progress has been made, particularly through the use of archery, the Deer Management Program must address increased attention to the problems associated with owners of small private (mostly residential) properties who are suffering serious impacts from deer and develop means for them legally to exercise effective control measures. EQAC recognizes that this problem is complicated by the overlay of existing State regulations and recommends that our county program officers work closely with State officials to ease these where possible.
 4. EQAC believes that the management program must continue to accomplish the following key objectives:
 - Immediate and sustained measures for reduction of the deer population in order to return the size of the local herds to levels consistent with the long term carrying capacity of their particular local habitats.
 - Ongoing monitoring and evaluation of new methods for maintaining population limits over the long term, such as immunocontraception and other experimental methods.
 - Consideration of development in the county and its effects on ecosystem health and biodiversity as these relate to deer management as well as to the quality of life generally.
 5. Since public acceptance of, and participation in, deer management programs is more easily achieved when there is full public understanding of the problem, the available management options, and their costs and other consequences, EQAC strongly recommends that the Board of Supervisors continue to provide for a vigorous program of public education as is now being done by the Animal Services Division and on the county’s Web site.
 6. EQAC endorses ongoing public input into the plan, including surveys of public opinion and the inclusion of major stakeholders (home owners, environmental preservationists, public safety

experts, wildlife biologists, public health experts, sport hunting groups, animal rights groups, etc.) in the continued refinement and implementation of the plan. EQAC fully supports continuation of both the input of a broad range of views and the use of spokespersons, such as the County Wildlife Biologist, who can articulate program goals and the ongoing management approach to the varied community groups and viewpoints.

ACKNOWLEDGMENTS

EQAC gratefully acknowledges the following individuals and organizations who have generously provided a variety of data and information included in this report and numerous helpful suggestions and recommendations:

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VII-2. IMPACTS OF GEESE IN FAIRFAX COUNTY

A. OVERVIEW

Canada geese, once almost exclusively migratory, have to an increasing extent become year-round residents in Fairfax County. Although these resident populations are not evenly distributed throughout the county, many of our ponds and lakes, both large and small, and their adjacent shore areas have been occupied as permanent habitat. Geese have also become an increasing problem on parkland, golf courses and similar facilities. The problem is not so much the animals *per se* but rather the fecal contamination they bring to our water bodies and watercourses and their fouling of grassy open areas. Geese wastes are a well-documented source of fecal coliform bacterial contamination, which has reached alarming levels in many ponds, lakes, and reservoirs, even those forming part of our domestic water supply. An additional problem is the damage resident geese cause to our marshes, where they feed on sprouting plants so voraciously that some once plentiful botanical species have all but disappeared. Addressing these problems inevitably requires reducing the goose population, but this is complicated, because geese are protected by federal migratory waterfowl laws.

B. BACKGROUND

1. Origins of the Goose Problem in Fairfax County

In earlier times, the Canada goose was a strictly migratory bird with its nesting range in wilderness areas of Canada and its winter range well to the south of our area. Geese passed through our area twice a year on their migrations. By the late 1960s, some Canada geese had begun to establish resident populations in this region. This is thought to have begun with birds that were propagated to stock local hunting preserves. Since that time, local Canada goose populations have undergone a dramatic upsurge. This increase now includes numerous populations of geese that have become permanent residents in the mid-Atlantic region rather than migrating. These permanent populations have become quite obvious in many parts of Fairfax County. Wildlife biologists estimate that the Canada goose population is increasing at about 15 percent annually, which indicates that problems associated with resident goose populations soon will increase to critical levels unless remedial actions are undertaken.

2. Environmental Impact of Geese

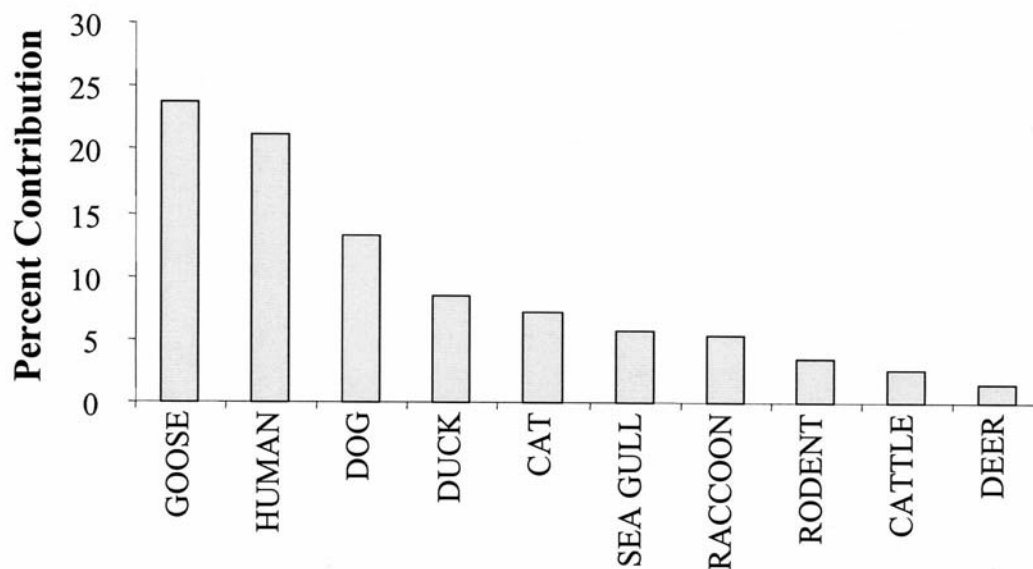
A primary impact of geese is environmental pollution, particularly pollution of streams, ponds, and lakes with fecal coliform bacteria from their wastes. The magnitude of the problem is illustrated in two examples below.

Several years ago, when the Evans Farm property in McLean was in the process of being rezoned for residential development, the farm pond, which was a prominent feature of the site, was extensively sampled to determine if it contained significant levels of pollution. It was known that a resident population of Canada geese was a major contributor to any pollution of the pond. Depending on where the water samples were taken in the pond, the levels of fecal coliform bacteria were found to be from 21 to 27 times those allowable in surface waters in the Commonwealth of Virginia. Drainage from this pond passed through an under-the-road culvert to a much larger pond on the other side of the highway that had two families of resident geese. This pond had fecal coliform counts about three times the allowable level.

More recently, an environmental pollution study was conducted to determine the total maximum daily load (TMDL) of fecal coliform contamination that should be permitted in a portion of Accotink Creek that feeds Lake Accotink. Federal Environmental Protection Agency (EPA) standards indicated that 98 percent of current levels of pollution should be eliminated, a truly draconian expectation. DNA tests to determine the sources of the extant fecal coliform bacteria pollution revealed that anseriform waterfowl (i.e., geese and ducks) accounted for 32 percent and other wildlife for about 17 percent of the total (see Figure VII-2-1). With waterfowl being federally protected species and other wildlife largely beyond our control, half of the current pollution load is effectively beyond the power of the county to eliminate in the near term.

Another major impact of resident geese is significant alteration of the ecology of our marshlands. While migratory geese visited marshes on their twice-yearly trips through our region, the stopovers were brief and were timed so that plants had either not yet sprouted or had matured sufficiently that they were not destroyed by feeding activity. However, populations of resident geese are permanent voracious foragers that feed on newly sprouting plants to the point that some plant species are nearly eliminated from the habitat. This is particularly true of plants such as wild rice, which reseed themselves annually and provide food to many animal species. When all of the sprouting plants are consumed before they can mature and produce seeds, there will be no new plants the following year. For example, where wild rice was once an abundant species, many of our marshes are now nearly devoid of it. Thus, because of the ways in which geese change the ecology of marshes they have caused loss not only of key plant species but also of the animal species that are dependent on those plants.

Figure VII-2-1
Sources of Fecal Coliform Pollution
in Accotink Creek



C. ISSUES IN ADDRESSING THE PROBLEM

1. Goose Population Biology

Canada geese are large birds weighing 20-25 pounds, with a life expectancy of some 20 years. Geese mate for life and remain together as pairs year-round. If one of the pair dies or is killed, the other will find a new mate. Mating season is from early February through early April, with nesting season from late March through mid May. Geese begin to nest at three years of age. Eggs are laid approximately one per day until there is an average of five eggs per nest. Incubation (sitting the eggs) does not begin until all eggs have been laid. Eggs not being incubated are cool to the touch. Incubation time is 28-30 days. Normally, all eggs hatch on the same day. Maturation of goslings occurs from early May to early July.

Geese prefer isolated sites near water to nest, with small islands being a favored location. Nests usually are built on the ground in the open, but occasionally are located in brushy or marshy areas if flooding is not a problem. If chased from their accustomed area or if the nesting area has too many pairs, they will find alternative sites, sometimes farther away

from water, sometimes near other ponds in the vicinity, and occasionally on rooftops or other unlikely locations.

Migration is a learned process with which resident geese have not become familiar. Geese return to the general area of their birth to nest, sometimes to the exact site and at least to a nearby pond or lake. Migratory geese nest in Canada while geese nesting in our area are resident geese that were born here. Whereas migratory geese have a flight range of 2,000-3,000 miles, resident geese rarely venture more than 100-200 miles and then only in search of food, water, or safety. Migratory geese do not become resident unless they are injured and can no longer fly for long distances.

Molting season runs from early June to late July. Flight feathers are lost in June and the birds are unable to fly for several weeks, but by early August new flight feathers are fully developed and all birds (except for those injured) are able to fly again. During the molting period, geese need to be near water so they can escape from predators by swimming. They also need an easily accessible food supply during this time.

Natural predators of geese include foxes, raccoons, large owls, snapping turtles, and more recently, coyotes.

2. Considerations of Public Opinion

Many citizens find considerable aesthetic reward in having a few geese in areas where they can be observed and feel that the presence of such attractive wildlife creates a pleasant ambience. While this may be true, many others find the fouling of yards, open space, and water bodies to be unacceptable, especially where geese congregate in appreciable numbers. Moreover, most of the public is unaware, or at best only dimly aware, of the extent to which geese are major polluters of our ponds, lakes, and reservoirs, including some of our water supply sources. As the general public becomes better informed about the pollution aspects of goose populations, greater consensus on remedial approaches should result.

3. Federal Limitations on Remedial Action

Geese, as migratory waterfowl, are protected by federal laws administered by the U.S. Fish and Wildlife Service. Therefore, population reduction by lethal measures applied to adult or juvenile geese is generally not an option. The Fairfax County Park Authority has its own egg addling permit applicable to its parklands. In situations where adult birds are creating an extreme nuisance, the Department of Agriculture Wildlife Service can send staff to round up and relocate them. However, the Fish and Wildlife Service does issue permits for egg addling (including egg oiling) programs as a means of population stabilization. Fairfax County holds such a permit for programs anywhere in the county

under supervision and/or monitoring by the County Wildlife Biologist. Use of trained Border Collies to harass geese into leaving an area is not regulated so long as they do not directly attack or kill the geese.

D. METHODS FOR POPULATION MANAGEMENT

Population management methods that utilize immediate population reduction are not an option due to stringent federal regulations against killing geese once they are hatched. However, the methods outlined below are permissible and accepted approaches to controlling goose populations. Population stabilization coupled with measures that discourage geese from future nesting in an area has proved effective in longer term reductions of population.

1. Population Stabilization

Egg addling and egg oiling are quite effective in preventing eggs from hatching. Strictly speaking, egg addling is vigorous shaking of the egg at a fairly early stage in order to homogenize the contents. This will prevent further development of the egg. Egg oiling coats the surface of the shell with a vegetable oil such as corn oil, which will prevent oxygen from getting to the interior of the egg. This also is effective in halting further development of the egg. Sometimes both methods are referred to as "egg addling." When a clutch of eggs is thus treated, the goose will continue to attempt to incubate them for the normal period, but they will fail to hatch, thus limiting the population to the adult geese already present.

2. Population Exclusion

Most nuisance abatement measures are based on population exclusion. For example, trained Border Collies have been successfully employed to herd geese away from areas where they constitute a nuisance. The geese soon learn to avoid areas patrolled by the dogs, regarding them as unsafe, and they move to other areas where they do not feel threatened. This method of control has been particularly effective in large, relatively open areas such as golf courses. The major negative aspect of this method is the impact on adjacent properties. When the dogs herd the geese off of one property, they necessarily go to the one next door or in the near vicinity. Thus, while one locale is benefited, adjacent locales are afflicted through transference of the problem.

3. Special Foraging Areas

In some cases, an area can be set aside where a small population of geese can be resident without creating an undue nuisance. However, in such cases the aesthetic appeal of having the geese nearby must be balanced by adequate consideration of the water pollution and other waste problems created.

4. Landscaping Modifications

Altering landscaping can sometimes be an effective tool in discouraging geese from congregating near ponds. Bushy plantings, reeds and tall grasses, strategically placed around a pond, will be perceived by geese as a hiding place for predators, thus discouraging them from using that area.

5. Repellents

There are commercially available, nontoxic chemical repellents that discourage geese from eating grass. The disadvantage to this approach is the necessity for frequent reapplications, since each time the grass is mowed most of the repellent is removed along with the clippings.

6. Prohibition of Feeding

Feeding geese encourages them to become resident and to congregate in areas where a "free lunch" is provided. This exacerbates the very nuisance that one is attempting reduce. Also, feeding bread and various kitchen scraps is harmful to the geese's health even though they will avidly feed on such items.

7. Combined Approaches

Clearly, combinations of several of the above approaches can be far more effective than their use individually. For example, the use of trained Border Collies together with landscaping modifications can be quite effective in creating an "undesirable" habitat. If egg oiling is added to this for the few nests that may be established, significant reductions in usage of this area in following years can be achieved.

E. PUBLIC EDUCATION PROGRAM NEEDS

Public awareness of both the pollution problems caused by geese and of the mating and nesting cycle of geese is the key to being able to effectively address the "goose problem." At present, insufficient attention has been given by the public media to the pollution aspects of the problem. Since this pollution creates significant public health risks, the problem needs coverage on the county Web site and through informative bulletins to local homeowners associations.

F. PUBLIC AGENCY RESPONSIBILITY

The office of the County Wildlife Biologist within the Animal Services Division of the Fairfax County Police Department has been assigned primary responsibility for management of geese by the Board of Supervisors. However, due to the fact that Canada geese are federally protected waterfowl, the U.S. Fish and Wildlife Service exercises significant regulatory and permitting functions that govern Fairfax County's geese management activities. Fairfax County was the first local jurisdiction in the nation to be granted a master permit for egg addling programs and is thereby authorized to train citizens, as individuals or groups, to conduct egg addling under its monitoring and control. Except for federally issued hunting permits, intentional killing of hatched geese by humans is prohibited by federal law. In cases where it is necessary for adult geese or hatchlings to be removed from an area, this activity is conducted by the staff of the U.S. Department of Agriculture - Wildlife Services under permit from the U.S. Fish and Wildlife Service.

The population stabilization (egg oiling) program is highly cost effective since, once trained, all labor intensive activities are performed by local citizen volunteers. The only staff activities required are training, monitoring, and reporting under the terms of the federal permit.

G. PROGRAM IMPLEMENTATION ACTIVITIES

Goose management programs have been implemented at a number of locations in Fairfax County. Among the locations and the measures implemented under the Fairfax County permit and monitoring are:

1. Annandale
 - a. Northern Virginia Community College - population stabilization and nuisance abatement, five years.
 - b. Pinecrest Community - population stabilization and nuisance abatement, four years.
 - c. Pinecrest Golf Course - population stabilization and nuisance abatement, four years.
2. Centreville
 - a. Franklin Farms - population stabilization, five years.
 - b. Westfields - population stabilization, four years.
3. Fairfax County
 - a. Lake Barcroft - population stabilization and nuisance abatement, six years.
 - b. Fairfax County Parks - population stabilization, six years.
 - c. Copeland Pond - population stabilization and nuisance abatement, five years.

- d. Brook Hills - population stabilization and nuisance abatement, five years.
- e. Waters Edge - population stabilization and nuisance abatement, four years.
- 4. Oakton
 - a. Fox Lake - population stabilization, four years.
- 5. Reston
 - a. Reston Community - population stabilization, five years.
- 6. Vienna
 - a. Trinity School - population stabilization, five years.
 - b. Champion Lake - population stabilization, four years

All of these programs have demonstrated reasonable degrees of success in stabilizing populations. In some cases, populations have actually declined over time due to efforts to discourage geese from further attempts to nest there.

In 2002, there were 275 eggs added under the county permit and approximately 1,200 under the separate Fairfax County Park Authority permit. In 2003, there were 255 eggs added at 61 nest sites under the county permit and 674 eggs at 123 nest sites under the FCPA permit. In 2004, due to staffing limitations, there were ten eggs from two nests added under the county permit and 1,403 eggs from 243 nests under the Park Authority Permit.

H. CONCLUSIONS

While geese in small numbers are regarded by many as a pleasant addition to the local ambience, large resident goose populations in many areas of the county constitute a major environmental nuisance and public health risk. Resident goose populations tend to congregate near ponds, lakes, and slow-flowing streams, which leads to contamination of these water bodies with high levels of fecal coliform bacteria. In addition, they foul the grassy open areas in the vicinity with their feces. The high growth rate of the resident goose population and the limitations on methods of control have raised pollution to levels that are not only environmentally unacceptable but that now constitute a significant public health concern.

While there are already good programs in place to address these problems, they need to be replicated more widely in additional areas of the county. Moreover, more intensive public information campaigns and community outreach efforts are badly needed to actively involve a larger number of individuals and community organizations in population control programs.

I. RECOMMENDATIONS

1. EQAC finds the current programs are effective and should be continued and, where feasible, expanded.
2. EQAC recommends that the current programs be replicated in many other areas of the county by training additional citizens and homeowner groups in goose population stabilization methodology.
3. EQAC recommends enhanced public education outreach to sensitize all Fairfax County residents and owners of nonresidential properties to the pollution problems caused by geese and the programs available for addressing them.
4. EQAC recommends enhanced public education outreach to acquaint all Fairfax County residents with the role excessive goose populations play in destruction of our marshland habitats.

ACKNOWLEDGMENTS

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Earl Hodnett, Wildlife Biologist, Animal Services Division, Fairfax County Police Department.

Charles Smith, Resource Management Division, Fairfax County Park Authority.

VII-3. WILDLIFE BORNE DISEASES OF CONCERN IN FAIRFAX COUNTY

A. OVERVIEW

There are a number of zoonotic diseases (those in which wildlife serves as a reservoir) that affect humans. Four such diseases of greatest concern in Fairfax County are West Nile Virus, Lyme Disease, Rabies, and the complex of diseases caused by fecal coliform bacteria. The causative agents, modes of transmission, and means of prevention are briefly discussed below. A new initiative, the Disease Carrying Insects Program, has been undertaken by the Fairfax County Health Department. The reader is referred to the Health Department's report on West Nile Virus and the Pilot Tick Surveillance Program for additional details in these areas.

B. BACKGROUND

1. West Nile Virus

West Nile Virus is transmitted to humans and other warm-blooded animals by mosquitoes that have fed on birds infected with the virus. Crows have been particularly implicated as a reservoir species, but it is known that many other bird species are also involved. Mosquitoes are intermediate carriers that convey the virus from birds to humans. There have also been several cases in Fairfax County of horses being infected. The principal intermediate carrier is *Culex pipiens*, the common house mosquito. There is currently no evidence for person-to-person transmission (except in the unusual situation of organ transplants or blood transfusions from infected donors). Some people infected with West Nile Virus apparently experience few, if any, symptoms. Others have mild flu-like symptoms such as low-grade fever, head and body aches, skin rash or swollen lymph nodes. In a few cases such as the elderly, children, and those with weakened immune systems, the infection may cause encephalitis (inflammation of the brain), meningitis (inflammation of the brain covering) or, occasionally, death. Encephalitis and meningitis symptoms include rapid onset of high fever, severe headache, stiff neck, muscle weakness, and coma. The virus is of recent occurrence in this country, having been first identified in New York in 1999. However, it has now spread to every state in the lower 48. The Centers for Disease Control and Prevention (CDC) of the U.S. Public Health Service predicts that the west coast will be particularly hard hit next year because the disease has recently appeared there, and the usual pattern is an eruption of cases the year or two following first appearance. By the end of 2002, CDC had confirmed 161 cases, including 18 deaths, since 1999. For the year 2003, these figures had jumped to 4,156 reported cases and 284 deaths. This major outbreaks in early 2003 resulted in 2,000 cases in Colorado,

1,000 in Nebraska, and 800 in South Dakota. The CDC figures on reported cases show a rapidly increasing incidence. There is almost certainly major underreporting of incidence, since most of those infected apparently have mild symptoms that do not require a visit to the doctor, and even for those actually infected and seeing a physician, the symptoms may be insufficient to trigger a report without confirmation by serologic tests.

a. Preventive Measures

i. Mosquito Habitat Elimination

An important preventive measure to reduce the chance of infection with West Nile Virus is to eliminate, wherever possible, standing water that provides a breeding habitat for mosquitoes. Any containers such as cans, pails, wheelbarrows, etc., should be emptied and stored in such fashion that water will not collect in them. Bird baths and similar containers should have the water changed every two or three days. Ponds can be stocked with the small fish *Gambusia* that feed on mosquito larvae. There are two species: *Gambusia affinis* and *G. holbrooki*. Both are highly effective in keeping ponds and lakes free of mosquito larvae. *Gambusia affinis*, the most common species, has become endemic in many areas of Eastern Virginia and can be readily transplanted from one pond to another.

ii. Insect Repellents

Since it is nearly impossible to completely eliminate the presence of mosquitoes, some of the most effective preventive measures available for mosquito-borne infections such as West Nile Virus and tick-borne Lyme disease are sprays or lotions containing DEET (N,N-diethyl-meta-toluamide). The active ingredient, DEET, was developed by the U.S. Department of Agriculture in 1946, originally for use by the military. The most convenient method of application to the exposed skin is as an aerosol spray. A recent study reported in the *New England Journal of Medicine* showed that the higher the concentration of DEET in the spray, the longer lasting the protection. In the case of mosquitoes, products containing 20% DEET were effective for four hours, those with 25% DEET were effective for five hours, and those with 35% DEET were effective overnight. It is estimated that there have been more than eight billion applications of DEET over the past 50 years with an excellent safety record. However, a study of DEET by pharmacologists at Duke University, reported in the November 2001 issue of the *Journal of Experimental Neurology*, indicated that frequent and prolonged DEET exposure might cause adverse neurological effects. It was recommended that use be limited to preparations containing no more than 30% DEET for adults and lower concentrations for children.

2. Lyme Disease

Lyme Disease, caused by the bacterial spirochete *Borrelia burgdorferi*, is transmitted to humans primarily, if not exclusively, by *Ixodes scapularis*, the common deer tick. Deer ticks are dark brown to black and about the size and shape of a sesame seed. The white-tailed deer appears to be the primary reservoir, but rodents have also been implicated. Lyme Disease was first identified in Lyme, Connecticut, in the mid-1970s when a group of children developed arthritis-like symptoms. Within a few days to several weeks of receiving an infected tick bite, most victims will have a red, slowly expanding "bull's-eye" rash (red in the center, pink at the periphery) and such symptoms as malaise, fever, headache, and muscle and joint aches. The longer a case of Lyme Disease persists without treatment, the more severe, debilitating, and long lasting the symptoms are likely to be, such as arthritis and neurologic abnormalities. Many of the physicians treating Lyme Disease have found three or four week courses of doxycycline or amoxicillin to be effective treatments for early stages of the disease, but later stages may require intravenous antibiotics for a month or more.

Confirmed cases of Lyme Disease underwent a sharp increase through June, 1997 (Table VII-3-1). The decrease of the next two years may be attributable to greater public awareness of the threat represented by deer ticks and greater use of proper preventive measures when hiking and working in wooded areas. It is unclear, however, whether a decrease in deer population will lead to a corresponding decrease in Lyme Disease cases, since other animals can act as reservoir species and may inhabit areas within which deer populations decline. However, it is interesting to note that neighboring, semi-rural Loudoun County, which has a large deer population, has the highest per capita incidence of Lyme Disease cases reported in the Commonwealth. In 2001, there were 65 cases, compared with 29 cases in 1999, according to the Loudoun County Health Department. This suggests a strong upward trend in incidence where there are large populations of white-tailed deer.

a. Preventive Measures

i. Vaccine

A vaccine for Lyme disease was introduced in 1999 but was withdrawn from the market in 2001 due to adverse reactions to it. No new vaccines have been introduced since that time. While it is true that vaccination of those persons intensively exposed to deer ticks might have been helpful, for the vast majority of the population, consistent use of ordinary preventive measures should be entirely adequate. When engaged in activities that might result in exposure to deer ticks, proper clothing is a must, preferably long pants tucked into boot tops or spraying the lower legs, trouser bottoms, and sock tops with insect repellent, since most ticks are encountered close to the ground.

Table VII-3-1 Reported Lyme Disease Cases Meeting Centers for Disease Control (CDC) Case Definition Program Fairfax County		
Period Covered	Reported Cases	Contracted outside of Fairfax County
July, 1994-June, 1995	14	N.A.
July, 1995-June, 1996	22	N.A.
July, 1996-June, 1997	31	N.A.
July, 1997-June, 1998	16	8
July, 1998-June, 1999	13	9
July, 1999-June, 2000	50	8
July, 2000-June, 2001	51	9
July, 2001-June, 2002	61	33
July, 2002-June, 2003	87	N.A.
July, 2003-June, 2004	109	N. A.

(Source: Fairfax County Department of Health)

ii. Insect repellent

The same DEET-containing repellents recommended for mosquitoes (see West Nile Virus above) are also highly effective for ticks. See the discussion of DEET-containing insect repellents in the West Nile Virus section above.

3. Rabies

Rabies is a viral disease that affects the nervous system and may have a post-infection latent period from a number of days to several weeks. During the latent period, between the time of an animal bite and the onset of overt symptoms, the virus is propagated along the nerve fiber sheaths until it reaches critical areas of the brain. While rabies has been

present in this area for many years, it exists at a low level with the incidence appearing to cycle over a period of several years. This is attributed to the fact that infection, when it reaches the symptomatic stage, is uniformly fatal. Thus, an infected animal may infect several others and there will appear to be a relatively high incidence, but when those animals die there are fewer carriers for a period of time when the incidence appears to be lower. We are currently experiencing a periodic upturn in the rabies cycle, particularly among foxes and raccoons. Rabies is transmitted to humans and other mammals through the saliva of an infected animal almost always in the overtly symptomatic stage, which usually only lasts about ten days. During this time, an infected animal usually exhibits aberrant behavior, such as a nocturnal animal being around during the day, exhibiting signs of confusion, showing an unsteady gait, desperately seeking water but unable to drink, often aggressively approaching dogs and humans, etc. The main wildlife reservoirs in this area (and the number of cases in 2002) are raccoons (52), foxes (9), skunks (9), and, to a lesser extent, some bats. Cases from July 1, 2004, to June 30, 2005, were raccoons (29), foxes (13), skunks (5), bats (6), and groundhogs (1). Domestic animals, e.g., dogs and occasionally cats, may act as secondary transmitters of the disease after having contracted it from a wildlife source. The incidence of rabies in animals fluctuates; for example, Fairfax County had 80 cases in 2002, 47 cases in 2003, and has had 52 cases by the end of July in 2004 and 54 cases by the end June in 2005. In CY 2004, 612 animals were tested, with 69 testing positive. Through October, 2005, of 480 animals tested, 35 were positive.

a. Preventive measures

The most important measure for prevention of rabies is to avoid being bitten by or direct contact with an animal that might be infected. If you encounter an animal that is behaving strangely or exhibiting symptoms such as excessive drooling, contact Fairfax County Animal Services Division at **703-830-3310** without delay. This also applies if you find a dead animal that you suspect may have died of rabies. Animal Services will send a professionally trained officer to impound the animal for quarantine and testing. If you are bitten or scratched or come in contact with the animal's saliva, seek immediate medical attention so a determination can be made as to whether you may require a course of preventive inoculations. The protective serum used for such inoculations has been substantially improved in recent years so that fewer doses are required, and those have fewer unpleasant side effects.

4. Fecal Coliform Bacterial Diseases

Fecal coliform bacterial diseases in humans are caused primarily through ingesting or wading or swimming in contaminated water. There are a number of bacteria that can be responsible, but the thing they share in common is being present in the gut and intestinal wastes of a variety of wildlife and domestic animals. The relatively new science of molecular genetic DNA testing has made it possible to reliably identify the particular animals responsible for the pollution of a given water sample. Studies carried out at

several sites in Fairfax County indicate that Canada geese living in and about ponds and streams are principal contributors, while ducks, deer, raccoons, foxes, and domestic dogs and cats are also significant sources (see Figure VII-2-1 on page 226). When the wastes from these animal sources are deposited directly into, or washed into, streams and ponds, the pollution can build up to hazardous levels. For example, one pond in the McLean area, inhabited by Canada geese that had become resident, was extensively tested several years ago and was found to have levels of fecal coliform bacterial contamination that ranged from 21 to 27 times the level allowable in surface waters in the Commonwealth of Virginia. Another occasional source of such contamination is from leaks, overflows, or ruptures in the public sanitary sewer system or private septic systems. While illness from such bacteria is usually not life threatening and is readily treated with antibiotics, exposure to waters that one has reason to believe may be polluted should be scrupulously avoided.

Several years ago, budgetary limitations led to consideration of eliminating the county's Stream Monitoring Program. EQAC intervened in the discussion, pointing out that this monitoring was environmentally critical and not duplicated in any other county programs. As a result, the Board of Supervisors directed that the program be continued. Recently, an agreement has been reached in which the Stream Monitoring Program for bacterial contamination is being reorganized. The collection of samples will now be handled by staff of the Department of Public Works and Environmental Services (DPWES) responsible for the watershed management program, since they are in the field on a regular basis and it is efficient for them to perform this function. Analysis of the samples will continue to be performed by the Department of Health laboratories. It is felt that this arrangement will provide for better and more efficient monitoring of the health and safety of our streams, lakes, and ponds.

a. Preventive measures

There is a general solution to this problem in which pollution of our surface waters is prevented in the first place. The main individual solution to the problem is to avoid disease caused by fecal coliform bacteria by not drinking water from sources whose pollution status is unknown and by not wading or swimming in water that is known to be, or suspected of being, polluted.

C. PUBLIC EDUCATION PROGRAM NEEDS

The Fairfax County Department of Health has available an excellent booklet entitled *Preventing Tick-borne Diseases in Virginia*. They also have a brochure entitled *Rabies and Animal Bites: What you should know and what you should do*. Additional information is available through the Health Department section of the county Web site <http://fairfaxcounty.gov/living/healthhuman/health.htm#environmental>

With the recent nearly epidemic explosion of West Nile Virus, there is near certainty of it becoming endemic in our area for the long term. Public education materials, comparable to those noted above, are available from our own county Health Department, especially at <http://www.fairfaxcounty.gov/fightthebite>. In addition, the Centers for Disease Control and Prevention of the U.S. Public Health Service has some recently-developed materials that are quite good. A new initiative, the Disease Carrying Insects Program, has been undertaken by the Fairfax County Health Department. The reader is referred to the Health Department's report on West Nile Virus and the Pilot Tick Surveillance Program for additional details in these areas.

Because of the frequently changing levels of pollution in our surface waters, it is not practical to create printed materials identifying those streams and ponds that are affected by fecal coliform bacterial pollution. However, our excellent county Web site is an ideal way for the public to receive frequent updates on results of the Stream Monitoring Program and notices about waters that should be avoided due to pollution.

The public media generally do a fairly good job of reporting the finding of rabid animals. Such incidents could also be posted on the county Web site as advisories.

D. PUBLIC AGENCY RESPONSIBILITIES

The primary public agency responsibilities lie in the following areas:

1. Public education;
2. Monitoring of disease incidence;
3. Monitoring of pollution and exposure hazards;
4. Providing animal control services; and
5. Providing mosquito abatement, where needed.

The Animal Services Division of the Fairfax County Police Department is responsible for animal control activities, such as impounding animals suspected of being rabid and similar wildlife-related activities. The Stormwater Planning Division of the Department of Public Works and Environmental Services will have responsibility for collection of water samples from streams, lakes and ponds. The Health Department has responsibility for most prevention and public education activities, water sample testing, and various monitoring and information gathering programs.

E. CONCLUSIONS

The upsurge of West Nile Virus and Lyme Disease require continual monitoring and public education and are rapidly becoming serious public health issues. Rabies is a continuing low

level, more or less steady state, problem. Waters polluted by excessive levels of fecal coliform bacteria require mitigation, where possible, and monitoring and posting to warn the public against exposure. Malaria, of which a very few scattered cases have been reported, will require careful monitoring and epidemiologic tracking as well as mosquito abatement.

F. RECOMMENDATIONS

The recommendations provided below address only the third section of this chapter (Wildlife Borne Diseases of Concern in Fairfax County). Recommendations addressing deer management and geese issues are found beginning on pages 204 and 215, respectively.

1. EQAC recommends that the Board of Supervisors provide continued active support to the reorganized Stream Monitoring Program in which the Stream Protection Strategies Program of the DPWES will perform sample collection and field testing and the Health Department will perform laboratory testing and analysis functions. EQAC recommends that county staff ensure the posting of advisories on the county Web site when polluted waters are identified. EQAC further recommends that the Board of Supervisors monitor the program through periodic reports to its Environment Committee.
2. EQAC recommends that the Health Department continue and enhance its excellent public education programs.
3. EQAC recommends that the Police Department continue its animal control program and, in conjunction with the Health Department, expand public education initiatives in key areas, such as control of rabies and of wildlife contributing to pollution of surface waters.
4. EQAC commends that the Board of Supervisors for providing active support to the newly instituted programs for epidemiology and abatement of insect borne diseases such as West Nile Virus and Lyme Disease. EQAC recommends that the Board of Supervisors monitor these programs through periodic reports to its Environment Committee by county staff.

ACKNOWLEDGMENTS

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Harriet Calloway, R.N., Epidemiologist, Fairfax County Health Department.

Laura Suzuki, R.N., MPH, Fairfax County Health Department.

John Ruthinoski, Fairfax County Health Department.

Jorge Arias, PhD., Fairfax County Health Department.

LIST OF REFERENCES

Fairfax County Department of Health. Preventing Tick-borne Diseases in Virginia.

Fairfax County Department of Health. Rabies and Animal Bites: What you should know and what you should do.

Fairfax County Department of Health. West Nile Virus Control and Mosquito Management Program. Disease Carrying Insects Program.

WILDLIFE AND THE ENVIRONMENT IN FAIRFAX COUNTY: SUMMARY OF RECOMMENDATIONS

Impacts of Deer in Fairfax County

1. EQAC recommends that the Board of Supervisors continue to implement and monitor the comprehensive deer management program set forth in the Integrated Deer Management Plan adopted in November, 1998 and refined by the County Executive's Deer Management Committee in the summer of 1999 and in subsequent periodic meetings. EQAC strongly supports the following broad goals encompassed in the plan and in the subsequent studies and evaluations:
 - Management based on reduction of local deer populations to sustainable levels.
 - Management based on a sound ecological approach that emphasizes biodiversity without preferential treatment of particular species.
 - Management based on an "in perpetuity" perspective that does not trade long-term interests for short-term gains.
 - Protection, restoration, and enhancement of the natural areas and environments that have been subjected to degradation by deer overabundance.
2. EQAC strongly commends active participation of the Fairfax County Park Authority in the deer management program in order to provide enhanced stewardship of the parks, golf courses, and other parklands under its care and management. EQAC strongly endorses the joint efforts of the Park Authority and the Animal Services Division of the FCPD to take the program to parks that have not yet been served. Further, EQAC recommends that techniques be employed to concentrate deer in the safest parts of smaller parks when using sharpshooters in order to maximize safety for surrounding neighborhoods.
3. EQAC believes that, while some progress has been made, particularly through the use of archery, the Deer Management Program must address increased attention to the problems associated with owners of small private (mostly residential) properties who are suffering serious impacts from deer and develop means for them legally to exercise effective control measures. EQAC recognizes that this problem is complicated by the overlay of existing State regulations and recommends that our county program officers work closely with State officials to ease these where possible.
4. EQAC believes that the management program must continue to accomplish the following key objectives:

- Immediate and sustained measures for reduction of the deer population in order to return the size of the local herds to levels consistent with the long term carrying capacity of their particular local habitats.
 - Ongoing monitoring and evaluation of new methods for maintaining population limits over the long term, such as immunocontraception and other experimental methods.
 - Consideration of development in the county and its effects on ecosystem health and biodiversity as these relate to deer management as well as to the quality of life generally.
5. Since public acceptance of, and participation in, deer management programs is more easily achieved when there is full public understanding of the problem, the available management options, and their costs and other consequences, EQAC strongly recommends that the Board of Supervisors continue to provide for a vigorous program of public education as is now being done by the Animal Services Division and on the county's Web site.
 6. EQAC endorses ongoing public input into the plan, including surveys of public opinion and the inclusion of major stakeholders (home owners, environmental preservationists, public safety experts, wildlife biologists, public health experts, sport hunting groups, animal rights groups, etc.) in the continued refinement and implementation of the plan. EQAC fully supports continuation of both the input of a broad range of views and the use of spokespersons, such as the County Wildlife Biologist, who can articulate program goals and the ongoing management approach to the varied community groups and viewpoints.

Impacts of Geese in Fairfax County

1. EQAC finds the current programs are effective and should be continued and, where feasible, expanded.
2. EQAC recommends that the current programs be replicated in many other areas of the county by training additional citizens and homeowner groups in goose population stabilization methodology.
3. EQAC recommends enhanced public education outreach to sensitize all Fairfax County residents and owners of nonresidential properties to the pollution problems caused by geese and the programs available for addressing them.
4. EQAC recommends enhanced public education outreach to acquaint all Fairfax County residents with the role excessive goose populations play in destruction of our marshland habitats.

Wildlife Borne Diseases of Concern in Fairfax County

1. EQAC recommends that the Board of Supervisors provide continued active support to the reorganized Stream Monitoring Program in which the Stream Protection Strategies Program of the DPWES will perform sample collection and field testing and the Health Department will perform laboratory testing and analysis functions. EQAC recommends that county staff ensure the posting of advisories on the county Web site when polluted waters are identified. EQAC further recommends that the Board of Supervisors monitor the program through periodic reports to its Environment Committee.
2. EQAC recommends that the Health Department continue and enhance its excellent public education programs.
3. EQAC recommends that the Police Department continue its animal control program and, in conjunction with the Health Department, expand public education initiatives in key areas, such as control of rabies and of wildlife contributing to pollution of surface waters.
4. EQAC commends that the Board of Supervisors for providing active support to the newly instituted programs for epidemiology and abatement of insect borne diseases such as West Nile Virus and Lyme Disease. EQAC recommends that the Board of Supervisors monitor these programs through periodic reports to its Environment Committee by county staff.

ANNUAL REPORT ON THE ENVIRONMENT

CHAPTER VIII

**NOISE, LIGHT
POLLUTION, AND
VISUAL POLLUTION**

VIII-1. NOISE

A. OVERVIEW

Noise is often considered to be unwanted sound; sound becomes undesirable when its intensity is such that it interferes with one's ability to hear something more desirable or when there is a desire to not hear anything at all (e.g., “silence is golden”).

Noise from road traffic, jet planes, garbage trucks, construction equipment, manufacturing processes, lawn mowers, leaf blowers, and boom boxes, to name a few, is among the audible sounds that are routinely broadcast into the air.

Noise at certain levels can negatively affects human health and well-being. Problems related to loud noise impacts include hearing loss, stress, high blood pressure, sleep loss, distractions, lost productivity, and a general perceived reduction in the quality of life and opportunities due to a loss of tranquility.

Citizens in Fairfax County experience noise in many ways. On some occasions, citizens can be both the causes and the victims of noise, such as when they are operating noisy vehicles or equipment (lawn mowers, leaf blowers, etc). There are also instances when citizens experience noise generated by others just as people can experience second-hand smoke. While in both instances noises are equally damaging, second-hand noise can be more troubling because it can have negative impacts on quality of life.

Noise is a byproduct of our everyday lives. Noise that is perceived as a detriment to our quality of life due to its intensity, its timing, and/or its source is defined as “noise pollution.”

One key element of determining whether noise is in fact “noise pollution” is to measure its intensity and how that intensity impacts society as a whole. Noise is measured by scientific instruments that receive the noise/sound and determine its location, time of incident, and intensity as it radiates from its source. Once levels are measured, society determines by noise standards or guidelines if each noise incident is, in fact, loud enough to be deemed noise pollution and in need of regulation.

Noise is one of society’s most prevalent concerns, especially to those citizens who live and work in and near major sources of noise such as airports, railroads, athletic fields, etc. How the intensity of the noise source is regulated must be based on scientific findings and not solely on human perception, although human perception, as described by community responses to noise, is an integral consideration in federal noise compatibility guidelines and related local regulations and policies.

Recent studies suggest a growing intolerance among citizens and communities for noise associated with airports, traffic, construction, and athletic events, etc. The impacts of noise/sounds on a community can include:

- Diminished privacy and quiet at home or at an outdoor recreation experience, vacation or rest site;
- Interrupted sleep;
- Interrupted entertainment and conversation;
- Interruptions at work or school; and
- Property damage such as broken windows.

B. AIRPORT NOISE

1. The Committee on Noise Abatement and Aviation at National and Dulles Airports (CONAANDA)

The Washington, D.C. area is served by three major airports: Washington Dulles International (“Dulles Airport”); Ronald Reagan Washington National (“National Airport”); and Baltimore-Washington International (“BWI”). These airports are among the busiest airports in the country. Aircraft operations at these airports generate noise that sometimes impacts the quality of life of neighborhoods located in and around their respective locations and along flight paths into and out of the airfields. Noise impacts associated with these operations has long been of concern to Fairfax County and other affected communities, and a regional committee has been established through the Metropolitan Washington Council of Governments (COG) to consider issues associated with aircraft operations at Dulles and National Airports.

Recently, the COG Board unanimously approved a recommendation by the Ad Hoc Airports Policy Committee to reconstitute COG’s Committee on Noise Abatement at National and Dulles Airports (CONANDA) by giving it an enhanced and broader mission to provide a balanced and integrated perspective on matters relating to airport and aviation policies in the Washington Metropolitan Region. This enhanced Committee is named the “Committee on Noise Abatement and Aviation at National and Dulles Airports” (CONAANDA).

CONAANDA's mission is to provide a regional policy perspective on airport noise matters on behalf of the Washington area's local governments, including Fairfax County. This Committee has been delegated by the COG Board of Directors to speak on its behalf on noise policy matters.

The Committee's composition consists of elected official voting members, in addition to nonvoting industry and citizen representatives. This structure was envisioned as the best forum in which to consider noise abatement measures and to provide balanced advice to the COG Board of Directors.

As noted on the COG Web site, in 1988, CONAANDA established its high priority recommendations for noise mitigation at National Airport, which included:

- A. Fleet mix goals;
- B. A nighttime restriction on large commercial aircraft; and
- C. A tightened nighttime noise/sound standard.

These priorities have continued to influence implementation of CONAANDA's annual work program. The Committee's work program continues to focus on noise abatement strategies for implementation at Ronald Reagan National and Dulles International Airports, with added emphasis to emerging legislation, the Potomac Project, Federal Aviation Administration (FAA) rule making, and studies for their impact on local noise strategies, especially nighttime noise, and land use noise compatibility planning.

Regular meetings of CONAANDA are held bimonthly on the second Wednesday of the month. The meetings are held at COG, which is located at 777 North Capitol Street, NE Washington, DC.

Both National and Dulles Airports are heavily used and are an important part of the region's overall economy. Typically, more than 50,000 total flights are conducted each month at these airports. This activity is made up of commercial flights between the Washington area and 103 domestic and 29 international destinations. At National, most flights are short to mid-range jet aircraft flights operated by major airlines. All types and sizes of aircraft operate at Dulles.

Operations at Dulles Airport have increased significantly, with typical monthly operations increasing from roughly 30,000 in mid-2003 to over 50,000 in late 2004. In late 2004, more than 1,700 operations would occur during a typical day, with weekday operations exceeding weekend day operations by several hundred. The scheduled operations between 7:00 A.M. and 10:00 P.M. show a typical pattern, with many flights in some hours and a relatively small number in other hours. Peaks are at 7:00 A.M., 12:00 P.M., 5:00 P.M., and 8:00 P.M., with low times at 10:00 A.M., 2:00 P.M., 6:00 P.M., and between 10:00 P.M. and 5:00 A.M.

National Airport now has less than half as many flights as Dulles Airport; in late 2004, there were typically 22,000 to 23,000 operations per month at National Airport. This breaks down to more than 700 flights each day, with operations on a typical weekday exceeding typical weekend day operations by 100-200 or more. Most flights occur between 7:00 A.M. and 10:00 P.M., as operations between 10:00 P.M. and 7:00 A.M. are limited to aircraft that meet stringent noise criteria. National Airport is subject to the Federal Aviation Administration's (FAA's) High Density Rule, which limits, with some exceptions, the air carriers to 37 scheduled operations per hour and the commuter carriers to 13 scheduled operations per hour. As a result, flight operations are fairly consistent over the course of the hours between 7:00 A.M. and 10:00 P.M.

2. The Metropolitan Washington Airports Authority (MWAA)

The Metropolitan Washington Airports Authority (MWAA), which operates both National and Dulles Airports, monitors aircraft and community noise around the clock at 32 locations in the Washington, D.C. Metropolitan Area. The monitoring equipment evaluates different sound events and separates those events likely to have been caused from aircraft from the remaining events, which are attributed to the community. The Metropolitan Washington Council of Governments' Committee on Noise Abatement and Aviation at National and Dulles Airports (CONAANDA) and the Airports Authority selected the monitoring sites from recommendations offered by the local governments.

In 2004, the Airports Authority's noise complaint centers at National and Dulles Airports reported receiving 185 noise complaints from 102 different callers. National Airport reported 94 complaints from 50 callers, while Dulles Airport reported 91 complaints from 52 callers.

MWAA reports that National Airport has one of the strictest noise regulations in place at any major airport in the United States. All aircraft operating between 10:00 P.M. and 7:00 A.M. must satisfy the Airport's nighttime noise limits or face monetary fines of \$5,000.00 maximum per violation. There were 16 violations during the year 2004. Civil penalties were sought for 14 violations and two letters of warning were issued. A total of \$39,000 was received from 13 penalties, with the remaining case pending.

Resources

Metropolitan Washington Airports Authority

Community Relations and Noise Abatement	703-417-8745
National Airport Noise Complaints	703-417-8020
Dulles International Airport Noise Complaints	703-572-8215

Federal Aviation Administration

Washington National Airport	703-413-1530
Dulles International Airport	703-471-1270
FAA Noise Ombudsman	202-493-5047

Other Aviation Facilities

Andrews Air Force Base-(auto information line)	301-981-1110
Baltimore-Wash Int'l Airport (BWI)-complaints	410-859-7021

The Metropolitan Washington Airports Authority (MWAA) has prepared a major update of the Noise Compatibility Study for Ronald Reagan Washington National Airport. This study, conducted in accordance with the provisions of the Federal Aviation Administration's "Part 150" Process, was designed to forecast future noise

contours at Reagan National Airport and to propose abatement and mitigation actions to reduce community noise impacts.

A resulting study report, which recommended noise abatement and mitigation measures, was released in September, 2004. Noise abatement recommendations included:

- a. The application of improved technology to keep arriving and departing aircraft over the Potomac River up to their designated turning points;
- b. An improved distribution of turning points from the Potomac River between five and ten miles south of the River; and
- c. the improvement of the Airport's noise monitoring and flight tracking system.

In October, 2004, the Fairfax County Board of Supervisors endorsed staff comments concerning these recommendations; the comments were generally supportive of the Part 150 noise abatement recommendations.

Because of the importance of this issue to the community, COG and CONAANDA partnered with MWAA throughout the process of development of the noise abatement and mitigation recommendations. A Part 150 Study Advisory Committee was established to assist and advise the Airport Authority in this study, and the Study Advisory Committee's recommendations were incorporated into a Part 150 Study document.

C. HIGHWAY NOISE

1. Background

Traffic in the Washington metropolitan area, which includes Fairfax County, continues to grow. This growth is due to increasing residential development in and around Fairfax County, especially to the west and north where adjacent counties are allowing almost uncontrolled residential development at growth rates which are some of the largest in the country. These increasing rates of residential growth are being allowed with little or no consideration of their impacts on the already over used and limited transportation infrastructure serving Fairfax County and the remaining metropolitan region.

The area's traffic ranks consistently as one of the most congested in the country--recent newspaper articles identify the area as the third most congested. As more lanes are added and some new roads are constructed, increased traffic generates more noise that, in turn, creates increased demands for noise attenuation or abatement measures such as:

- The construction of barriers/walls or raised berms;
- The provision of landscaping/vegetation; and
- The provision of acoustical design techniques.

Barriers have become the most popular choice. Since the early 1990s in Fairfax County, barriers constructed by the Virginia Department of Transportation (VDOT) have consisted of a solid wall of absorptive concrete that breaks the line of sight and noise levels between vehicles and homes. Although noise barriers have a maximum decibel reduction of 20 dBA, most only provide 10-12 decibel reductions.

Noise is an important environmental consideration for highway planners and designers. The U.S. Department of Transportation and state transportation agencies are charged with the responsibility of optimizing compatibility of highway operations with environmental concerns. Highway noise problems have been addressed by numerous investigations, including evaluations of the following:

- Noise sources and highway noise reference energy mean emission levels;
- Noise impacts at receptor locations;
- Effects of site geometry, meteorology, ground surface conditions, and barriers on noise propagation; and
- Alternative methods of mitigating noise impacts.

Precise, uniform, state-of-the-art, highway traffic noise measurement procedures for assessing impacts in the vicinity of roadways, and designing effective, cost-efficient noise barriers, are a recognized need in the highway noise community.

2. State Policy

The State of Virginia adopted its original noise abatement policy in 1989. The policy established criteria for providing noise protection in conjunction with proposed highway projects in the State. Implementation of the policy has aided in the construction, or construction approval, of more than 100 federally-funded sound barriers.

Experience with this policy created considerable feedback from citizens and elected officials from across the country. The culmination of this process was the adoption of changes to the Virginia's State policy in 1997.

The key changes to the policy were to:

- 1) Raise the cost-effectiveness ceiling from \$20,000 per protected receptor to \$30,000 per protected residential property based other state practices;
- 2) Clarify that Virginia will not participate in any retrofit project along an existing highway when not in conjunction with an improvement for that highway; and
- 3) Add the possibility for third party funding of the amount above VDOT's ceiling if the abatement measure otherwise satisfies the criteria.

3. Noise Study Submission Guidelines

The Board of Supervisors (BOS) adopted Zoning Ordinance Amendment ZO 00-330 in 2000, which permits noise barriers in excess of the Zoning Ordinance fence/wall height limitations where needed to reduce adverse impacts of highway noise on properties adjacent to major thoroughfares, or to reduce adverse noise impacts of commercial and industrial uses on adjacent properties. Such barriers may be approved by the Board of Supervisors in conjunction with the approval of a proffered rezoning for any zoning district, including P districts, or in conjunction with the approval of a special exception application, or by the Board of Zoning Appeals as a special permit use.

Pursuant to Par. 1 of Sect. 8-919 or Par. 3F of Sect. 10-104 of the Zoning Ordinance, a noise impact study is required to demonstrate the need for the noise barrier and the proposed height and level of mitigation to be achieved by the noise barrier. In conjunction with the adoption of this Zoning Ordinance Amendment, the Planning Commission and Board of Supervisors requested staff to develop standardized noise study submission guidelines, which would be submitted to the Planning Commission for review and comment prior to implementation.

In response to this request, a noise study submission form and guidelines have been developed. This form requires the applicant to provide information regarding the assumptions and data used in the noise study, the results of the analysis, and a detailed description of the visual impacts of the noise barrier and its effectiveness in providing noise mitigation. Given that the cost of providing this information may be prohibitive for a noise barrier request on an individual residential lot, a second form has been developed which requires less information for noise barrier requests on individual residential properties.

Staff from the Department of Planning and Zoning, Department of Transportation, and the Virginia Department of Transportation participated in the review and development of these guidelines. In addition, acoustical engineers from several firms that have submitted noise studies to the county in the past were invited to provide written comments on two occasions; participating consultants met with staff to discuss their issues and concerns regarding the proposed noise study submission guidelines. In addition, the Northern Virginia Building Industry Association (NVBIA) and the National Association of Industrial and Office Properties (NAIOP) provided comments comment on these guidelines.

In 2002 both the Planning Commission's Environment Committee and the total Planning Commission reviewed and endorsed the Noise Study Submission Guidelines. In April, 2002 the Board of Supervisors accepted the proposed guidelines without change.

D. RECOMMENDATIONS

1. Continue to support airport noise monitoring (day and night) and compatible land use planning near airports in the county. Consistent with existing policy, proposals for rezonings for residential development should not be supported in areas with projected noise impacts of DNL 60 dBA or greater.
2. Develop and distribute materials to educate the public on airport noise issues, including airport noise contours, noise compatible planning and regulation, noise changes that may result from new construction and changes in flight frequencies, and noise complaint procedures. Incorporate these educational materials into the county's overall environmental educational efforts by encouraging all science and environmental teachers to include noise and its implications into their lesson plans.
3. Encourage the use of opportunities provided by the Virginia Department of Transportation (VDOT) that allow for third party contributions to noise barrier construction when the VDOT cost criteria preclude VDOT's construction of such barriers. Through this VDOT policy, neighborhoods affected by high levels of highway noise can participate in the funding of barriers that would not otherwise be constructed.
4. When desired by the citizens most impacted, encourage the retention and planting of noninvasive vegetation to provide visual shielding from highways. Where possible, support the provision of vegetated areas adjacent to highways wide enough and dense enough to provide some noise reduction benefits. Where feasible and appropriate, pursue the combined use of plant materials and noise barriers.
5. Review all airport and highway studies that require Environmental Assessments or Environmental Impact Statements under the National Environmental Policy Act (NEPA) for consistency with county policies addressing transportation-related noise and mitigation.

VIII-2. LIGHT POLLUTION

A. OVERVIEW

Light pollution is a general term used to describe light output, primarily from exterior (outdoor) sources, in commercial, residential, and roadway settings that is excessive in amount and/or that causes harmful glare to be directed into the path of travel or into residential neighborhoods. Light pollution is thus both a safety issue and a quality of life issue. With the increasing urbanization of Fairfax County, exterior (outdoor) lighting and light pollution in its many forms have become pressing issues to our communities. In the past, Fairfax County had some regulations regarding exterior lighting, but they were minimal and out of date. A major effort was undertaken in 2002 to write a totally new and modern Outdoor Lighting Ordinance that took into account the numerous advances that have been made in lighting technology in recent years. This highly successful effort included several workshops, in which EQAC and a number of local experts participated, and came to fruition in the early summer of 2003 with the adoption of the new Ordinance. It is regarded by experts in the outdoor lighting community as being one of the best such ordinances in the mid-Atlantic region and has been cited and largely copied by localities in Connecticut, Illinois, and California. However, there are one or two areas that could not be adequately addressed by the new ordinance, since suitable standards and convenient measurement technology were not available. This report will focus on these areas.

B. ISSUES AND PROBLEMS

The main issues and problems of exterior lighting and light pollution may be summarized as follows:

1. Glare

Glare, as defined by the Illuminating Engineering Society of North America (IESNA), falls into three main categories:

- a. Disability glare – Disability glare, also known as veiling luminance, is caused by light sources that shine directly into one's eyes and is dangerous because it is blinding (i.e., it totally overloads the eye's light sensor cells).
- b. Discomfort glare – Discomfort glare may not necessarily reduce the ability to see an object, but it produces a sensation of discomfort due to high contrast or non-uniform distribution of light in the field of view.
- c. Nuisance or annoyance glare – Nuisance glare is that which causes complaints such as, "The light is shining in my window."

Glare is a significant and pervasive problem that seriously impairs both safety and quality of life. Glare demands attention in that one's eyes are naturally attracted to bright light, and at night this destroys the eye's dark adaptation, which is a serious driving hazard. Obtrusive lighting by commercial establishments to attract attention is a serious problem as is selection of inappropriate fixtures for exterior residential lighting. A major problem is the high intensity lighting of sports facilities, such as ball fields and tennis courts, adjacent to residential neighborhoods. Glare and excessive illumination (which are two separate problems) cast into surrounding residential neighborhoods not only detracts from the quality of life but can make it difficult for pedestrians and homeowners to see their surroundings.

2. Light Trespass

Light trespass is the poor control of outdoor lighting such that it crosses property lines and detracts from the property value and quality of life of those whose property is so invaded. It is particularly common when obtrusive commercial or recreational lighting is immediately adjacent to residential neighborhoods or when a homeowner uses inappropriate fixtures, light levels, and lighting duration, often in the interest of "security." It is generally categorized in two forms:

- a. Adjacent property is illuminated by unwanted light.
- b. Excessive brightness (often called "glare") occurs in the normal field of view.

Both of these forms may be present in a given situation. Illumination, that is, the amount of light energy falling on a surface, is readily measured by simple hand held instruments and is expressed in foot candles. The new ordinance establishes 0.5 foot candles as the limit of illumination at the property line of the property producing the illumination. Illumination levels above that are regarded as prohibited light trespass.

Glare or excessive brightness is a more complex and difficult-to-measure phenomenon. It is experienced when the light producing source (the bulb) is directly visible, but also depends on the luminance of the source and on the contrast between that source and the surrounding background. For example, even a very bright light source viewed against a noonday sky doesn't seem particularly glaring or objectionable, but the same source viewed against a night sky is very objectionable and seems so bright as to be almost painful. One of the problems in addressing this kind of light trespass, or more properly glare trespass, is that there have not been good standards for acceptable limits, and instruments to measure this kind of glare are necessarily complex and difficult to operate.

3. Security

Much outdoor lighting is used in the interest of providing security. These safety concerns often result in bad lighting rather than real security. One reason often cited for today's bright lights is that high wattage is needed to deter crime. However, studies

have shown that if light is overly bright with excessive glare it makes it easier for a person to hide in the deep shadows created by objects in the harsh glaring light. This might actually encourage crime rather than discourage it. The debate as to whether or not additional light provides more safety has been emotional rather than factual. The few rigorous studies that have been done reveal no connection between higher lighting levels and lower crime rates. This may be due to people with nefarious intent taking more risks in better lit areas. For example, the National Institute of Law Enforcement and Criminal Justice found no statistically significant evidence that lighting impacts the level of crime (Upgren, 1996). Thus, the supposed correlation between a high level of security lighting and reduced crime appears to be nothing more than a popular myth.

4. Urban Sky Glow

Urban sky glow is brightening of the night sky due to manmade lighting that passes upward with the light rays reflected off of submicroscopic dust and water particles in the atmosphere. Although urban sky glow was first noted as a problem by the astronomical community, it is by no means any longer solely an astronomical issue. With the increasing urbanization of many areas of the U.S., all citizens in those areas are now being affected. In Fairfax County, which is now an urban county, improper lighting has seriously degraded the darkness of our local night skies into a pallid luminescence that many of our citizens find objectionable.

5. Energy Usage

Smart lighting techniques, which direct all of the light generated onto the target area, reduce energy consumption and hence the use of fossil fuels. Several engineering estimates suggest that at least 30 percent of outdoor lighting is being wasted through light energy spilling upward and outward rather than being directed downward onto the target area. Also, many installations are greatly over-illuminated as well as being lighted for unnecessary durations, further compounding the energy wastage. Inefficient lighting incurs both direct financial costs and hidden environmental costs. It has been estimated by national organizations studying light pollution that in excess of \$8 billion of electricity is being wasted annually on obtrusive and inefficient outdoor lighting (see data from Virginia Outdoor Lighting Task Force and the International Dark-Sky Association). Since electricity generation in the eastern part of this country is mostly from fossil fuels, every unnecessary kilowatt of electrical energy generated also produces air pollution, unnecessary greenhouse gases and acid rain.

C. CURRENT COUNTY STANDARDS AND REGULATIONS

In EQAC's view, Fairfax County now has an excellent ordinance that prescribes limits for the maximum wattage of light sources and for the amount of illumination and glare in commercial and residential districts. However, these standards do not cover all roadways (particularly main roadways, which are under the jurisdiction of the Virginia Department of Transportation (VDOT)); therefore, some roadways represent a continuing source of

glare and light pollution. Also, installations existing at the time of adoption of the new Ordinance that were noncompliant are allowed under State law to continue until such time as the fixture requires replacement.

An important shortcoming is that the effects of glare into residential neighborhoods from sources such as nearby park lights and lights on nearby commercial buildings and school facilities are not as fully addressed as would be desirable.

Fairfax County's *Policy Plan: The Countywide Policy Element of the Comprehensive Plan* (2000 Edition) recognizes the nuisance of light emissions arising from increasing urbanization and recommends that efforts be made to avoid creating sources of glare that interfere with residents' and/or travelers' visual acuity. To put this into practice, the county's Zoning Ordinance contains standards for illumination limits. Specifically, it requires that illumination shall not exceed 0.5 foot candles at the property line in residential districts and that flickering or bright sources of light shall avoid being a nuisance in residential districts. However, the issue of glare, as opposed to illumination level, needs to be seriously addressed.

D. ADDRESSING THE PROBLEM

While the new Ordinance very adequately addresses new and replacement installations of outdoor lighting and fixtures in commercial and residential districts, much roadway lighting remains a problem because it is prescribed by VDOT, which is not subject to local control. The recently passed Virginia law and policy to use henceforth only fully shielded fixtures will eventually mitigate these problems as older fixtures are replaced. Ensuring that new residential installations meet Code requirements represents a potentially significant compliance problem and will require that both review and inspection personnel will be fully aware of the new Code requirements and diligent in their application and enforcement.

One of the most common street lights in use, the drop-lens, cobra-head fixture, draws 150 watts. A fixture with reflective backing and shielding can direct all light below the horizontal plane with the same illumination of streets and homes and use only 100 watts. The same possibility exists with the popular 175 watt unshielded mercury vapor lamp. Both the 150-watt cobra-head fixture and the 175-watt mercury vapor lamp cast light laterally as well as down. As a result, substantial glare is often cast directly into the eyes of drivers. This glare destroys drivers' dark adaptation, creating potential safety hazards. In many cases the driver is not able to see the roadway any better than he or she would with lower-wattage properly shielded lights, and in many cases his or her vision is much worse. Because they cut down on glare, shielded fixtures not only are safer for drivers, but, according to experts (see references), actually make it easier for pedestrians and home owners to see their surroundings.

By redirecting this wasted energy, lower wattage lights provide the same amount of illumination in the areas where it is needed. These fixtures have reflective backing and full cut-off shielding to direct all light below the horizontal plane, with 90 percent of the light directed below an angle of 20 degrees from the horizontal. For example, a 50-watt metal

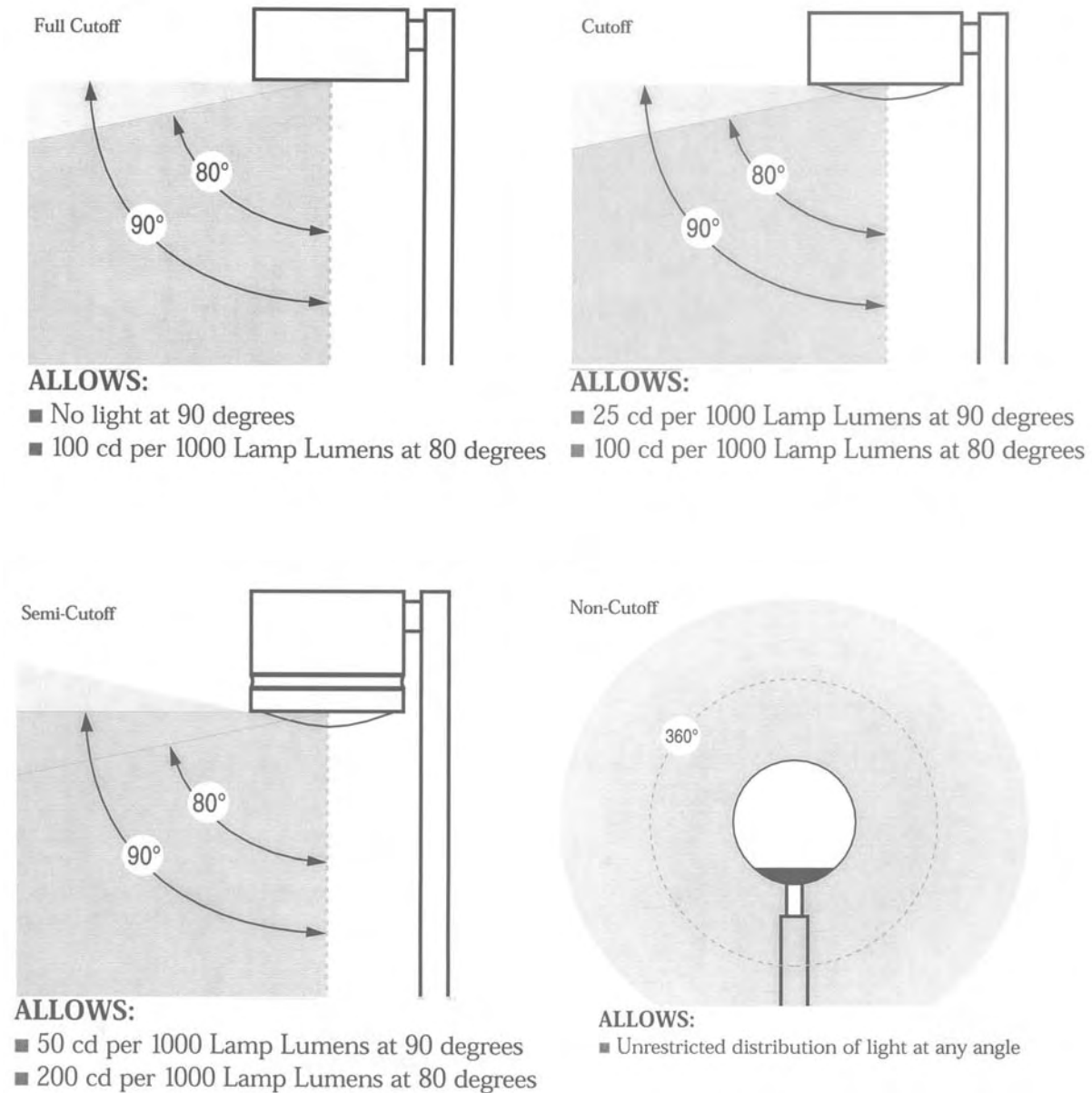
halide lamp with a reflective shield will provide as much illumination below the horizontal plane as the 150-watt cobra-head fixture or the 175-watt unshielded mercury vapor lamp. These newer types of fixtures, which are recommended by the Illuminating Engineering Society of North America, are widely available and direct all light below the horizontal plane, thereby eliminating lateral glare (see Figure VIII-2-1). It is estimated that it takes only three years of energy savings to recoup the initial investment in these fixtures. The lower wattage fixtures provide energy savings, improved driver safety, better visibility for pedestrians, and an improved ambiance and security for neighborhoods. Several municipalities, such as Tucson, Arizona, San Diego, California, and Sanibel Island, Florida, have adopted street lighting ordinances requiring these newer fixtures.

Most security lighting is overdone, with high wattage lights burning from dusk to dawn. As noted earlier, constant levels of illumination tend to be largely ignored because they are commonplace, and they waste a huge amount of energy. The large amount of glare produced by high intensity sources creates shadows that provide hiding places for intruders. Moreover, the constant glare and light trespass onto adjacent properties is a major source of annoyance to their occupants. On the other hand, lights that are activated by motion within a controlled area attract immediate attention and, at the same time, use very little energy and create intrusion on adjacent properties only when such attention is desired. For example, if one is using 300 watts of security lighting for an average of 10 hours each night and converts to an infrared motion sensor control that turns on the lights only when there is motion in the controlled area, energy cost is reduced to almost nil. In addition, the cost of the added sensor-control hardware can be recovered in as little as two to four months due to the energy saving. At the same time, security is increased rather than decreased, and glare and light trespass onto adjacent properties is virtually eliminated.

Glare is a significant and pervasive problem, but one that is relatively easily solved by installing fully shielded light fixtures, or in some cases using supplementary shielding panels, to prevent light trespass onto adjacent residential properties. Where it is not possible to completely eliminate glare through the use of shielded fixtures, inexpensive motion detector controls can limit the harsh light to only a minute or two when it is really needed.

Light trespass is a term of relatively recent origin and denotes (1) glare that is generated by sources on one property that lie within the normal field of view of the occupants of another property, and (2) light that spills over the boundaries of one property onto another, thereby producing unwanted illumination of it. Increasingly, such light intrusions are being regarded as trespass violations every bit as serious as physical trespass of a person onto the property of another. Such problems can now be readily avoided by the selection of proper fixtures, intensity levels, and the use of timers and sensors/controllers. These are areas where our new and comprehensive County Ordinance does an excellent job of spelling out acceptable technology.

Figure VIII-2-1
Effects of Cut-off and Non Cut-off Luminaires



(Sources: Paulin, Douglas, *Full Cutoff Lighting: The Benefits*, IESNA Web site, and Shaflik, Carl, *Environmental Effects of Roadway Lighting*, Information Sheet Number 125, International Dark-Sky Association, Tucson, Arizona, August 1997.)

Sky glow is also readily addressed by the selection of properly designed modern fixtures for new installations and phased retrofit of current inadequate installations. The cost of such retrofits is normally recoverable within a reasonable time period (usually estimated at about three years) through efficiently placing all of the light onto the desired area and the resulting lower energy usage.

Adherence to the following four principles will do much to mitigate or eliminate light pollution.

- a. Always illuminate with properly shielded fixtures that prevent the light source itself, and the resultant glare, from being directly visible. This is done by using cutoff fixtures or supplementary shielding that keeps all of the illumination below the horizontal plane and directed onto the target area.
- b. Do not over-illuminate. Never use more illumination than needed for the task at hand. Using a 400 watt floodlight to illuminate a small parking area or a flag at night is overkill and wastes a great deal of energy. A properly shielded and adjusted 250 watt luminaire (light source + fixture) can illuminate an area just as effectively as an older style 1,000 watt light source.
- c. Always aim lighting downward, keeping all of its distribution within the property lines and below the horizontal plane so that it is not a source of glare. Light trespass onto adjacent properties is unnecessary, inconsiderate, and potentially illegal.
- d. Do not burn lighting all night long with the intention of improving security. Using infrared motion sensor-controlled lighting that comes on instantly when there is motion in the designated area is far more effective as a security measure. That rapid change from dark to light draws the immediate attention of everyone in the surrounding area, including security and law enforcement personnel on patrol, and may well be unsettling enough to cause illicit intruders to immediately flee. Lighting that stays on all night draws no special attention and is an enormous waste of energy.

E. PUBLIC AGENCY RESPONSIBILITIES

Compliance with glare standards for residences and other private property is the responsibility of the county's Zoning Enforcement Branch. The county has 18 Zoning Inspectors (two per magisterial district) to oversee all Zoning Ordinance enforcement. Any enforcement activity dealing with light is complaint-driven. Typically, light-related complaints represent about 0.5% of total complaints. The county does not respond to anonymous complaints. Complaints are either filed directly with the Zoning Enforcement Branch or are forwarded by the staff of a member of the Board of Supervisors. The causes of the complaints were usually fast food establishments, security lighting for residences,

athletic facilities (e.g., ball fields, driving ranges), or churches. The Zoning Inspectors typically resolve violations with informal enforcement such as a verbal warning that there is a violation and how it may be remedied. A written notice of violation or civil action can be used if needed. Beyond the general glare standards, the county frequently is able to impose additional restrictions through the provisions of the rezoning, special permit, and special exception processes.

The Fairfax County Park Authority and the Fairfax County Public Schools are the two largest users of recreational and sports field lighting in the county. Parks and schools by their very nature are usually located in the midst of residential communities where their outdoor lighting, if inadequately designed, can seriously impact the surrounding residents. Schools, particularly high schools, often have sports practice sessions extending into the early evening hours and games that begin after the dinner hour and run into the later evening hours. In addition, schools of all categories often have “security” lights that burn from dusk to dawn. Our park system, faced with increasing demand for team athletic facilities, will necessarily have to turn to synthetic turf and lighting during the evening to enable greater utilization of its existing fields. It is the responsibility of both organizations to use better designs and better equipment than employed heretofore in addressing these needs. To do less unnecessarily and unfairly impacts the surrounding neighborhoods and diminishes both property values and quality of life.

One of the most onerous sources of light pollution is the obtrusive lighting of commercial and industrial facilities, particularly commercial retail and service establishments. While their desire to attract attention to themselves is understandable, abusive excesses degrade the overall ambience of our commercial areas and materially degrade the quality of life in adjacent residential neighborhoods. This is of particular concern in the case of “by-right” development, where there are no public hearings (e.g., Planning Commission, Board of Zoning Appeals, Board of Supervisors) at which adjacent property owners and neighborhoods can register their concerns and see approval conditioned on appropriate restrictions. In such “by-right” cases, the initial responsibility would necessarily fall almost entirely upon the Land Development Services function of the Department of Public Works and Environmental Services, which reviews all proposed plans before a building permit is issued and subsequently conducts inspections to ensure that the work is in compliance with regulations. Evaluation of plans for compliance would add a small amount of effort to the review process but would add only a negligible amount to the inspection process.

At this time, the county has no formal policies regarding street lighting. Some neighborhoods within the county prefer to have local streets lighted, while others do not. Whether or not the county provides street lighting is often driven by budget priorities, and, unless there is a demonstrable public safety need, the priority for retrofitting an established community is usually low. More often, street lighting is addressed in the overall planning of new subdivisions. In these cases, the Land Development Services function of DPWES would have responsibilities for both reviewing the plan and inspecting the implementation of it.

Responsibility for the lighting of main roadways is under the jurisdiction of the Virginia Department of Transportation (VDOT). Historically, local communities and neighborhoods have had to deal directly with VDOT over roadway lighting issues. It has proven very difficult to influence VDOT's choice of fixtures and technical standards, even when it can be demonstrated that their proposed implementation will result in unacceptable levels of glare and light trespass in adjacent residential neighborhoods. However, quite recently, encouraging headway has been made in getting VDOT to recognize the severity of the problem and to take some limited first steps to address it.

F. PUBLIC EDUCATION AND AWARENESS NEEDS

The general public needs awareness of the sources and problems of light pollution and of the methods by which these can be best addressed. The county staff has prepared an excellent and very informative 16 page booklet to explain the new Outdoor Lighting Ordinance (available at <http://fairfaxcounty.gov/DPZ/Zoning/lightingbrochure.PDF>). It can also be made available in printed version to individuals, homeowners groups, and community associations directly through appropriate county offices and through the district offices of the members of the Board of Supervisors. The complete Ordinance in convenient form is available on the Fairfax County Web site at <http://fairfaxcounty.gov/DPZ/Zoningordinance/articles/Art14.PDF>. In addition, the International Dark Sky Association and the Illuminating Engineering Society of North America (IESNA) maintain Web sites with a variety of technical information on lighting issues and technology.

Our county's 16 page booklet provides much of the information that architects, contractors, and electricians need to familiarize themselves with our lighting codes and specifically what is not permitted (e.g., unshielded security lights, angle-directed post or building mounted fixtures, wall packs without shielding or baffling, excessive wattage or unshielded floodlights, light-trespass onto other properties, etc.) and what practices are recommended. Our county review and inspection personnel should make sure that members of the development, contractor, and building management communities with whom they deal will be fully aware from the outset of the revised standards in the new Ordinance and how best to address them.

There is an excellent Web site (<http://www.qualityoutdoorlighting.com>) that illustrates many examples of good, bad, and ill-conceived lighting practices right here in our local area. It can play a central role in education of the public.

G. CONCLUSIONS

The principal means to prevent poor exterior lighting practices is a comprehensive code or ordinance, because this provides well thought out standards for, and enforceable and legal restrictions on, specific lighting practices that affect the community and its quality of life.

Numerous jurisdictions have adopted codes and ordinances that have proven very effective in reducing light pollution and preventing light trespass. A properly conceived and well written code permits all forms of necessary illumination at reasonable intensities, but requires shielding and other measures to prevent light pollution and light trespass. A good code applies to all forms of outdoor lighting, including streets, highways, and exterior signs, as well as lighting on dwellings, parks, schools, commercial and industrial buildings, parking areas, and construction sites. A good code also provides for reasonable exceptions for special uses within acceptable time periods and subject to effective standards. In EQAC's opinion, Fairfax County's newly adopted Outdoor Lighting Ordinance is an outstanding example of such a code. As the county has gained experience with application of the new Ordinance, some areas have been discovered where small adjustments and fine-tuning will be beneficial, but the solid foundation has been laid and should serve us well into the future.

The Fairfax County Park Authority, because of its need to increase the hours of utilization of existing sports fields by installing lights to illuminate them, bears a special responsibility to ensure that such lighting systems do not adversely impact adjacent residential properties. The results with a test rectangular field that was outfitted with lights and artificial turf have been very unfortunate. While the illumination at the property line met the 0.5 foot-candle limit for light spillover, the glare from the fully exposed, high-intensity lamps on 70 foot poles facing a residential neighborhood was disastrously intense (in the range of 12,000 lumens at 200 feet). This same concern applies equally to the Fairfax County Public Schools (FCPS), which also use lighted sports fields.

The county needs to work closely with VDOT to achieve better lighting practices on roadways within Fairfax County that are under VDOT jurisdiction. Current VDOT lighting and proposed new installations are regarded as being very intrusive by adjacent neighborhoods. However, it should be noted that a newly enacted law requiring the Commonwealth to acquire only shielded fixtures should materially improve VDOT practices in this regard on new installations and as old fixtures are replaced.

Much of the security lighting, both residential and commercial, in Fairfax County is poorly conceived, excessive in intensity, and improperly directed and controlled. These deficiencies could be corrected at relatively low initial costs that would be rapidly recovered through the energy savings realized. This will require considerable public education to familiarize the using public with the issues and the available technology.

Much lighting in residential neighborhoods uses old style fixtures (or new but poorly designed ones) that cause excessive glare and light trespass onto adjacent properties. The new comprehensive Ordinance and an intensive public awareness campaign should be used to address correction of these problems. Single family dwellings especially need to be brought into compliance with the spirit and provisions of the revised Ordinance, for that is where the majority of us live and where our quality of life is most affected by intrusive lighting.

Poor lighting design, particularly in commercial areas, is contributing to excessive and highly objectionable sky glow. The new Ordinance and retrofitting or adjustment of fixtures can eliminate the worst of this effect.

H. RECOMMENDATIONS

1. EQAC recommends that the Board of Supervisors ensure that the Fairfax County Park Authority and the Fairfax County Public Schools fully comply with the new Ordinance and consistently follow the recommendations of the Illuminating Engineering Society of North America. EQAC further strongly recommends that the Board of Supervisors appoint a small independent task force to develop recommendations and specifications for athletic field lighting throughout the County, and that these be used to amend the Outdoor Lighting Ordinance.
2. EQAC recommends that the Board of Supervisors direct that all exterior lighting fixtures installed on Fairfax County facilities and properties be consistent with the new Ordinance and follow the recommendations of the Illuminating Engineering Society of North America. EQAC further recommends that the Board of Supervisors direct that all older lighting fixtures under county control that do not meet the above standards be replaced on a phased basis with the newer recommended fixtures. EQAC notes that these steps will lead to significantly lower energy costs that will recoup the costs of the changeover within a reasonable period of time.
3. EQAC recommends that the Board of Supervisors work with VDOT and Virginia elected officials to eliminate unnecessary roadway lighting and to achieve replacement of existing poorly designed fixtures (under the control of VDOT) on our roadways with the same type of fixtures specified in Recommendation 2 above.
4. EQAC recommends that the Board of Supervisors continue to monitor and evaluate the effectiveness of the recently enacted Outdoor Lighting Ordinance to determine any areas in which enhancements and modifications may be needed and to ensure that lighting standards and practices and the reduction of light pollution in Fairfax County are comprehensively addressed.
5. EQAC recommends that the Board of Supervisors support county staff efforts to develop any additional technical information that may be needed for the education of architects, contractors, electricians, and builders as to what the county permits and does not permit in the field of illumination and the technology available for compliant installations.

LIST OF REFERENCES

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Fairfax County, Virginia, *Policy Plan: The Countywide Policy Element of the Comprehensive Plan*, 2000 Edition.

Fairfax County, Virginia, Zoning Ordinance (Chapter 112 of the *Fairfax County Code*)

Illuminating Engineering Society of North America Web site, <http://www.iesna.org/>.
(There are numerous subsidiary and related Web sites)

International Dark-Sky Association Web site, <http://www.darksky.org/>
National Electrical Manufacturers Association Web site, <http://www.nema.org/>.
(Particularly see their White Paper on Outdoor Lighting Code Issues.)

Virginia Outdoor Lighting Taskforce (VOLT) Web site, <http://www.volt.org/> .

Quality Outdoor Lighting Web site, <http://www.qualityoutdoorlighting.com/> .

VIII-3. VISUAL POLLUTION AND URBAN BLIGHT

A. OVERVIEW

Historically, the term “pollution” has referred primarily to the fouling of air, water, and land by wastes or from the byproducts of human activities. In recent years it has come to signify a wider range of disruptions to environmental quality. Both noise pollution and light pollution issues have been addressed earlier in this chapter. This section focuses on visual blight/pollution issues, including such things as proliferation of signs, billboards, litter, dumps, junkyards, and the like, which are important components of visual pollution.

Simply stated, “blight” is something that impairs or destroys appearance and results in a deteriorated condition. In recent times, urban blight has come to include a wide range of visual pollutants that degrade the ambience of our communities, including such things as trash and litter on roadsides, unkempt properties, above-ground power and communications transmission lines, communication towers, intrusive and objectionable advertising signage, and other forms of visual impairments. Without doubt, signage that is excessive in amount and inappropriate in placement is the most ubiquitous of these “pollutants.”

B. SIGNS AND BILLBOARDS

Unnecessary signs and billboards, almost always placed as some kind of advertising, have been called “visual pollution,” “sky trash,” “litter on a stick,” and “the junk mail of American roadways.” Nothing can destroy the distinctive character of our communities and countryside more quickly or thoroughly than uncontrolled signs and billboards.

Imagine your ideal destination. Chances are, the first thing that springs to your mind are charming communities with tree-lined streets, tasteful architecture, and friendly people who are proud of where they live, not a clutter of signs and billboards. Increasingly though, intrusive signage is marring our ideal destinations and making every place look the same. A proliferation of on-premise signs creates visual clutter that detracts from the unique character and beauty of a place. However, appealing signs that are compatible with local character contribute to a neighborhood or downtown, cultivating local pride and inviting travelers to stop.

Signs in the public rights-of-way have been around for as long as there have been public rights-of-way, but the numbers have spiraled out of control in recent years. Between fields of “popsicle-stick” signs for homebuilders and politicians, and signs for weight loss, work-at-home businesses, painting, hauling, and other signs plastered on every available traffic

sign and utility pole, everyone in Fairfax County has something to hate about the proliferation of signs.

Communities can regain control of their visual environment, preserve their distinctive character, and protect natural beauty and the environment by enacting and enforcing ordinances that control signage and billboards. Reducing sign and billboard blight helps communities reclaim local beauty and character. Excellent alternatives to large intrusive signs and billboards, such as wayfinding signs, logo signs, and tourist-oriented directional signs, can help people locate local businesses and are minimal in their visual impact.

C. TELECOMMUNICATION TOWERS AND UTILITY TRANSMISSION LINES

In 1996, Congress passed the landmark Federal Telecommunications Act to encourage the rapid development and growth of new telecommunications technology such as wireless telephones and digital television. However, antenna towers, often of considerable height, have been built near people's homes, next to historic buildings, or in rural, scenic areas. Towering above trees, neighborhoods, and protruding into the skyline, such towers often have a very unappealing visual impact (see the Web site <http://www.scenic.org> for examples). Reconciling the requirements of communications engineering and community aesthetics is a difficult and growing problem but one that must be directly addressed if both needs are to be properly served.

The visual blight associated with above ground utility lines besets both our residential and commercial areas. These lines and poles are particularly objectionable in our local shopping areas where they obstruct the vision of drivers and greatly impair the visual attractiveness of the locale.

D. ADDRESSING THE PROBLEM

Creating sign regulations developed with community input encourages business owners to erect less intrusive signs that reflect an area's spirit, contributing to civic pride and helping to revitalize commercial districts. Regulations should encourage signs that quickly communicate their message, complement their surroundings, and enhance the visual character of the community. Attractive on-premise signs can help encourage citizens and business owners to work together to improve and revitalize local appearance.

The Fairfax County Zoning Ordinance, Article 12, deals with signs and signage regulations. It deals comprehensively and at length with permitted and non-permitted signage and what kind of sign needs a permit versus signage not requiring a permit. The Ordinance appears to cover the subject thoroughly, but the fact that impermissible signage is overabundant indicates that enforcement is lacking, and perhaps that county staff functions are not organized in a way that could provide cost effective enforcement. In

addition, the Ordinance has a significant shortcoming in Article 12, in that there is no explicit provision therein for civil penalties (i.e., fines) for failure to obey it. Rather, it relies on Article 18-903.1.H and I to deal with Infractions and Civil Penalties. However, these two provisions deal only with Sections 12-301 and parts of 12-104. Thus, the entirety of Sections 102, 103, and part of Section 104 are not addressed. This is very important, since adequate civil penalties can readily pay for an effective enforcement program.

The other key component of an effective enforcement program is the requisite political will on the part of the Board of Supervisors. It is a given that the well-organized real estate industry will vigorously resist any real enforcement program that would impose limits, no matter how reasonable, on their current practice of excessive and obtrusive signage. The many small business enterprises that litter the roadsides and telephone poles with illegally placed signs will complain that enforcement will deprive them of livelihoods. Finally, political campaign signage, in which the lawmakers themselves have a vested interest, is a sensitive issue despite recognition of the current abusive practices.

The Board of Supervisors initiated the Fairfax County Sign Task Force in August, 2000. In September, 2001, the Task Force issued its report, *“Illegal Signs in the Right of Way”* which:

- Examined current Fairfax County practices and enforcement procedures regarding signs within and along the roadways;
- Evaluated other jurisdictions’ best practices in dealing with illegal signs; and
- Recommended amendments to the county’s sign ordinance and suggested new legislative approaches to address this problem.

Thus far the report and its recommendations have met with inaction.

Communities can do much to regulate the height, number, and location of wireless telecommunication towers by enacting strong ordinances. Without good ordinances, communities are at the whim of telecommunication companies that avidly seek sites for towers and property owners who may willingly lease land for a tower. Fairfax County recently prevailed at the Virginia Supreme Court in a decision that required VDOT to reasonably comply with the Fairfax County Zoning Ordinance in siting monopole towers within the VDOT right-of-way.

E. PUBLIC AGENCY RESPONSIBILITIES

The Sign Task Force concluded that there is no one agency within the county government that is devoted to removing impermissible signs or prosecuting persons who erect the signs in violation of the law. The Task Force concluded that cleanup efforts are inadequate unless a county official receives complaints or VDOT receives complaints. Therefore, it appears that what little effort there is to remove signs is reactive rather than proactive. Some neighboring communities assign specific persons to this job, but Fairfax County

does not have such a system. In fact, Zoning Inspectors do have authority delegated to them from VDOT to remove illegal signs. However, on many occasions when county inspectors have removed signs (e.g., on a Friday afternoon), they are back up by Monday morning or sooner.

The ordinance needs to be changed to empower the citizenry to take action, but this would be facilitated by State enabling legislation. Good citizens attempting to help the county by removing signs themselves are not clearly authorized to do so; therefore, they are inviting a liability action when they do remove signs. At present, about the only way the ordinary citizen can be involved with removing signs without some risk of liability action is through the VDOT Adopt-a-Road Program. In this program, a group agrees to become responsible for keeping a stretch of roadside cleaned of debris and litter and is, in effect, deputized with authority to remove impermissibly placed signs along with other litter. However, this program applies only to VDOT rights-of-way. A comparable program is needed with respect to utility poles which are placed within easements.

F. RECOMMENDATIONS

The recommendations below are substantially similar to those submitted last year but have been amended in accordance with advice supplied by the County Attorney's Office and the Zoning Enforcement Division of the Department of Planning and Zoning.

1. EQAC strongly recommends that the lack of an explicit provision in Article 12-300 of the present Ordinance for assessment of civil penalties be rectified at the earliest opportunity. It is recommended that Article 18-903 of the Ordinance be amended by deleting items 1.H and 1.I.. These provisions should be replaced by new, more comprehensive, language built directly into Article 12 as follows:

PART 4 12-400 VIOLATIONS, INFRACTIONS, AND PENALTIES

12-401 General provisions

1. Any sign erected, placed, or affixed contrary to any of the provisions of this Article or contrary to any provisions of any permit issued under this Article shall be, and is hereby declared to be, unlawful.
2. Any person (whether owner, officer, lessee, principal, agent, employee or otherwise), corporation, or organization who violates any of the provisions of this Article, or permits such violation, or fails to comply with any of the requirements hereof shall be subject to the enforcement provisions of this Part.
3. Upon becoming aware of any violation of any provision of this Article, the Zoning Administrator shall serve notice of such violation on the

person committing or permitting the same, which notice shall require the violation to cease within such reasonable time as is specified in the notice. After such notice is sent and such violation is not ceased within such reasonable time as is specified in the notice, then the Zoning Administrator may proceed to remedy the violation as provided in Section 402 below. The Zoning Administrator may also revoke a residential or non-residential use permit to terminate the violation. Any written notice of the Zoning Administrator shall include a statement informing the recipient that a right to appeal the notice of a zoning violation or a written order within thirty days may exist in accordance with Sect. 15.2-2311 of the Code of Virginia and Part 3 of Article 18 of the Zoning Ordinance, and that the decision shall be final and unappealable if not appealed within thirty days. The appeal period shall not commence until such statement is given.

4. In addition to the remedies provided in Par. 3 above, the Zoning Administrator may initiate injunction, mandamus, or any other appropriate action to prevent, enjoin, abate, or remove such erection, placement, or affixation in violation of any provision of this Article. Such action may also be instituted by any citizen who may be aggrieved or particularly damaged by any violation of any provisions of this Article.

12-402 Infractions and Civil Penalties

1. A violation of the provisions of this Article shall be deemed an infraction and shall be punishable by a civil penalty of \$100 for the first violation at a specific location; any subsequent violations at the same location arising from the same set of operative facts shall be punishable by a civil penalty of \$250 for each separate offense. Any violation arising from the same set of operative facts at the same location which persists for sixty (60) days or more may, at the discretion of the Zoning Administrator, thereafter be subject to injunction, mandamus, or any other appropriate action to prevent, enjoin, abate, or remove such violation.

2. Each day during which any violation of the provisions of this Article is found to have existed at the same location shall constitute a separate offense. However, in no event shall any such violation arising from the same set of operative facts at the same location be charged more frequently than once in any ten day period, nor shall a series of such violations arising from the same set of operative facts at the same location result in civil penalties which exceed a total of \$5000.

3. The designation of a particular violation of this Article at a particular location as an infraction pursuant to Par. 1 above shall be in lieu of criminal sanctions except for any violation resulting in injury to any person or persons.

4. After having served a notice of violation on any person committing or permitting a violation of the Zoning Ordinance provisions enumerated in this Article and if such violation has not ceased within such reasonable time as is specified in such notice, then, upon the approval of the County Attorney, the Zoning Administrator shall cause two (2) copies of a summons to be served upon such person.

5. Such summons shall contain the following information:

- A. The name and address of the person, corporation or organization charged.
- B. The nature of the infraction and the Ordinance provision(s) being violated.
- C. The location, date, and time that the infraction occurred or was observed.
- D. The amount of the civil penalty assessed for the infraction.
- E. The manner, location, and time in which the civil penalty may be paid to the County.
- F. The right of the recipient of the summons to elect to stand trial for the infraction and the date for such trial.

6. The summons shall provide that any person, corporation, or organization summoned for a violation may elect to pay the civil penalty by making an appearance in person or in writing by mail to the Department of Finance at least seventy-two (72) hours prior to the time and date fixed for the trial and, by such appearance, may enter a waiver of trial, admit liability, and pay the civil penalty established for the offense charged. Such summons shall provide that the signature to an admission of liability shall have the same force and effect as a judgment of court, however, an admission shall not be deemed a criminal conviction for any purpose.

7. If a person, corporation, or organization charged with a violation does not elect to enter a waiver of trial and admit liability, the violation shall be tried in the General District Court in the same manner and with the same right of appeal as provided by law. A finding of liability shall not be deemed a criminal conviction for any purpose.
 8. The remedies provided for in this section are cumulative and not exclusive and shall be in addition to any other remedies provided by law.
2. The Fairfax County Sign Task Force made several recommendations. EQAC strongly urges the Board of Supervisors to again consider the Task Force's report and either implement its findings or reconstitute the Task Force to find alternatives that are more palatable to the Board and citizens of the county.
- After holding a public hearing, the Board, pursuant to Virginia Code §33.1-375, should enter into an Agreement with the Commissioner of VDOT to enforce Virginia Code § 33.1-373. The Agreement would provide for sharing civil penalties collected after the county's costs have been recovered. [The Task Force provided a draft Agreement for the Board to consider.]
 - The county should fully support the county Sheriff's program of using inmates for removal of roadside litter, including removal of signs illegally posted in a right-of-way.
 - The county should implement a pilot project of approximately six months to determine whether additional resources are needed, and if so, develop a list of alternatives for further evaluation and ranking in terms of cost benefit analysis for the Board to use as it decides whether to expand the Agreement or move in a different direction.
 - The county should conduct an information and public outreach program regarding restrictions of signs in the public rights-of-way and any new county program to prosecute sign violations.
 - The county Executive should send letters to public entities within the county advising them of illegal signs and outcomes of posting same.
 - The Board should invite VDOT to consider implementing in Fairfax County additional possible deterrents to minimize illegal signs in the rights-of-way.
 - As part of its Legislative Program, the Board should seek an amendment to the Code of Virginia that would declare all signs illegally posted in a right-of-way to be abandoned and, therefore, illicit trash that may be removed by anyone.

- If the above is not successful or possible, then the alternative is to seek an Amendment to the Code of Virginia that would permit individuals, as opposed to organized groups, to participate in the Adopt-A-Highway program to remove or cleanup illegal signs as duly authorized representatives of the Commissioner.
 - The County should seek an Amendment to the Code of Virginia placing reasonable limitations on political campaign signs in the right-of-way. The County should offer recommendations for limits on the number, minimum distance between individual signs, and the time frame for posting and then removing the signs.
3. The Environmental Quality Advisory Council supports the general premise underpinning each of the Task Force's recommendations above, but believes that before the county seeks major amendments to the Code or introduces new programs of its own, a study should be performed to determine the impact on existing programs, staffing, and budget, and that a cost benefit analysis determine the extent to which the proposed amendments or additions would contribute to reducing visual pollution in a cost effective manner, having due regard for the possibilities of cost recovery through the rigorous imposition of civil penalties.

NOISE, LIGHT POLLUTION, AND VISUAL POLLUTION: SUMMARY OF RECOMMENDATIONS

Noise

1. Continue to support airport noise monitoring (day and night) and compatible land use planning near airports in the county. Consistent with existing policy, proposals for rezonings for residential development should not be supported in areas with projected noise impacts of DNL 60 dBA or greater.
2. Develop and distribute materials to educate the public on airport noise issues, including airport noise contours, noise compatible planning and regulation, noise changes that may result from new construction and changes in flight frequencies, and noise complaint procedures. Incorporate these educational materials into the county's overall environmental educational efforts by encouraging all science and environmental teachers to include noise and its implications into their lesson plans.
3. Encourage the use of opportunities provided by the Virginia Department of Transportation (VDOT) that allow for third party contributions to noise barrier construction when the VDOT cost criteria preclude VDOT's construction of such barriers. Through this VDOT policy, neighborhoods affected by high levels of highway noise can participate in the funding of barriers that would not otherwise be constructed.
4. When desired by the citizens most impacted, encourage the retention and planting of noninvasive vegetation to provide visual shielding from highways. Where possible, support the provision of vegetated areas adjacent to highways wide enough and dense enough to provide some noise reduction benefits. Where feasible and appropriate, pursue the combined use of plant materials and noise barriers.
5. Review all airport and highway studies that require Environmental Assessments or Environmental Impact Statements under the National Environmental Policy Act (NEPA) for consistency with county policies addressing transportation-related noise and mitigation.

Light Pollution

1. EQAC recommends that the Board of Supervisors ensure that the Fairfax County Park Authority and the Fairfax County Public Schools fully comply with the new Ordinance and consistently follow the recommendations of the Illuminating Engineering Society of North America. EQAC further strongly recommends that the Board of Supervisors appoint a small independent task force to develop recommendations and specifications for athletic field lighting throughout the County, and that these be used to amend the Outdoor Lighting Ordinance.

2. EQAC recommends that the Board of Supervisors direct that all exterior lighting fixtures installed on Fairfax County facilities and properties be consistent with the new Ordinance and follow the recommendations of the Illuminating Engineering Society of North America. EQAC further recommends that the Board of Supervisors direct that all older lighting fixtures under county control that do not meet the above standards be replaced on a phased basis with the newer recommended fixtures. EQAC notes that these steps will lead to significantly lower energy costs that will recoup the costs of the changeover within a reasonable period of time.
3. EQAC recommends that the Board of Supervisors work with VDOT and Virginia elected officials to eliminate unnecessary roadway lighting and to achieve replacement of existing poorly designed fixtures (under the control of VDOT) on our roadways with the same type of fixtures specified in Recommendation 2 above.
4. EQAC recommends that the Board of Supervisors continue to monitor and evaluate the effectiveness of the recently enacted Outdoor Lighting Ordinance to determine any areas in which enhancements and modifications may be needed and to ensure that lighting standards and practices and the reduction of light pollution in Fairfax County are comprehensively addressed.
5. EQAC recommends that the Board of Supervisors support county staff efforts to develop any additional technical information that may be needed for the education of architects, contractors, electricians, and builders as to what the county permits and does not permit in the field of illumination and the technology available for compliant installations.

Visual Pollution

The recommendations below are substantially similar to those submitted last year but have been amended in accordance with advice supplied by the County Attorney's Office and the Zoning Enforcement Division of the Department of Planning and Zoning.

1. EQAC strongly recommends that the lack of an explicit provision in Article 12-300 of the present Ordinance for assessment of civil penalties be rectified at the earliest opportunity. It is recommended that Article 18-903 of the Ordinance be amended by deleting items 1.H and 1.I.. These provisions should be replaced by new, more comprehensive, language built directly into Article 12 as follows:

PART 4 12-400 VIOLATIONS, INFRACTIONS, AND PENALTIES

12-401 General provisions

1. Any sign erected, placed, or affixed contrary to any of the provisions of this Article or contrary to any provisions of any permit issued under this Article shall be, and is hereby declared to be, unlawful.

2. Any person (whether owner, officer, lessee, principal, agent, employee or otherwise), corporation, or organization who violates any of the provisions of this Article, or permits such violation, or fails to comply with any of the requirements hereof shall be subject to the enforcement provisions of this Part.

3. Upon becoming aware of any violation of any provision of this Article, the Zoning Administrator shall serve notice of such violation on the person committing or permitting the same, which notice shall require the violation to cease within such reasonable time as is specified in the notice. After such notice is sent and such violation is not ceased within such reasonable time as is specified in the notice, then the Zoning Administrator may proceed to remedy the violation as provided in Sections 402 below. The Zoning Administrator may also revoke a residential or non-residential use permit to terminate the violation. Any written notice of the Zoning Administrator shall include a statement informing the recipient that a right to appeal the notice of a zoning violation or a written order within thirty days may exist in accordance with Sect. 15.2-2311 of the Code of Virginia and Part 3 of Article 18 of the Zoning Ordinance, and that the decision shall be final and unappealable if not appealed within thirty days. The appeal period shall not commence until such statement is given.

4. In addition to the remedies provided in Par. 3 above, the Zoning Administrator may initiate injunction, mandamus, or any other appropriate action to prevent, enjoin, abate, or remove such erection, placement, or affixation in violation of any provision of this Article. Such action may also be instituted by any citizen who may be aggrieved or particularly damaged by any violation of any provisions of this Article.

12-402 Infractions and Civil Penalties

1. A violation of the provisions of this Article shall be deemed an infraction and shall be punishable by a civil penalty of \$100 for the first violation at a specific location; any subsequent violations at the same location arising from the same set of operative facts shall be punishable by a civil penalty of \$250 for each separate offense. Any violation arising from the same set of operative facts at the same location which persists for sixty (60) days or more may, at the discretion of the Zoning Administrator, thereafter be subject to injunction, mandamus, or any other appropriate action to prevent, enjoin, abate, or remove such violation.

2. Each day during which any violation of the provisions of this Article is found to have existed at the same location shall constitute a separate offense. However, in no event shall any such violation arising from the same set of operative facts at the same location be charged more frequently than once in any ten day period, nor shall a series of such violations arising from the same set of operative facts at the same location result in civil penalties which exceed a total of \$5000.

3. The designation of a particular violation of this Article at a particular location as an infraction pursuant to Par. 1 above shall be in lieu of criminal sanctions except for any violation resulting in injury to any person or persons.

4. After having served a notice of violation on any person committing or permitting a violation of the Zoning Ordinance provisions enumerated in this Article and if such violation has not ceased within such reasonable time as is specified in such notice, then, upon the approval of the County Attorney, the Zoning Administrator shall cause two (2) copies of a summons to be served upon such person.

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- A. The name and address of the person, corporation or organization charged.
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- D. The amount of the civil penalty assessed for the infraction.
- G. The manner, location, and time in which the civil penalty may be paid to the County.
- H. The right of the recipient of the summons to elect to stand trial for the infraction and the date for such trial.

6. The summons shall provide that any person, corporation, or organization summoned for a violation may elect to pay the civil penalty by making an appearance in person or in writing by mail to the Department of Finance at least seventy-two (72) hours prior to the time

and date fixed for the trial and, by such appearance, may enter a waiver of trial, admit liability, and pay the civil penalty established for the offense charged. Such summons shall provide that the signature to an admission of liability shall have the same force and effect as a judgment of court, however, an admission shall not be deemed a criminal conviction for any purpose.

7. If a person, corporation, or organization charged with a violation does not elect to enter a waiver of trial and admit liability, the violation shall be tried in the General District Court in the same manner and with the same right of appeal as provided by law. A finding of liability shall not be deemed a criminal conviction for any purpose.

8. The remedies provided for in this section are cumulative and not exclusive and shall be in addition to any other remedies provided by law.

2. The Fairfax County Sign Task Force made several recommendations. EQAC strongly urges the Board of Supervisors to again consider the Task Force's report and either implement its findings or reconstitute the Task Force to find alternatives that are more palatable to the Board and citizens of the county.
 - After holding a public hearing, the Board, pursuant to Virginia Code §33.1-375, should enter into an Agreement with the Commissioner of VDOT to enforce Virginia Code § 33.1-373. The Agreement would provide for sharing civil penalties collected after the county's costs have been recovered. [The Task Force provided a draft Agreement for the Board to consider.]
 - The county should fully support the county Sheriff's program of using inmates for removal of roadside litter, including removal of signs illegally posted in a right-of-way.
 - The county should implement a pilot project of approximately six months to determine whether additional resources are needed, and if so, develop a list of alternatives for further evaluation and ranking in terms of cost benefit analysis for the Board to use as it decides whether to expand the Agreement or move in a different direction.
 - The county should conduct an information and public outreach program regarding restrictions of signs in the public rights-of-way and any new county program to prosecute sign violations.
 - The county Executive should send letters to public entities within the county advising them of illegal signs and outcomes of posting same.

- The Board should invite VDOT to consider implementing in Fairfax County additional possible deterrents to minimize illegal signs in the rights-of-way.
 - As part of its Legislative Program, the Board should seek an amendment to the Code of Virginia that would declare all signs illegally posted in a right-of-way to be abandoned and, therefore, illicit trash that may be removed by anyone.
 - If the above is not successful or possible, then the alternative is to seek an Amendment to the Code of Virginia that would permit individuals, as opposed to organized groups, to participate in the Adopt-A-Highway program to remove or cleanup illegal signs as duly authorized representatives of the Commissioner.
 - The County should seek an Amendment to the Code of Virginia placing reasonable limitations on political campaign signs in the right-of-way. The County should offer recommendations for limits on the number, minimum distance between individual signs, and the time frame for posting and then removing the signs.
3. The Environmental Quality Advisory Council supports the general premise underpinning each of the Task Force's recommendations above, but believes that before the county seeks major amendments to the Code or introduces new programs of its own, a study should be performed to determine the impact on existing programs, staffing, and budget, and that a cost benefit analysis determine the extent to which the proposed amendments or additions would contribute to reducing visual pollution in a cost effective manner, having due regard for the possibilities of cost recovery through the rigorous imposition of civil penalties.

APPENDIX A

EQAC RESOLUTIONS AND POSITIONS NOVEMBER, 2004 THROUGH NOVEMBER, 2005

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**ENVIRONMENTAL QUALITY ADVISORY COUNCIL
RESOLUTION SUPPORTING SMART GROWTH
ACROSS THE COUNTY**

February 9, 2005

WHEREAS, The Land Use Section of the Comprehensive Plan clearly outlines the objectives across the County that includes:

- Objective 1: "... a clear future vision of an attractive, prosperous, harmonious, and efficient community",
- Objective 2: "...areas of community focus which contain a mixture of compatible land uses",
- Objective 3: "...a supply of land sufficient to meet the needs for housing, commercial, industrial, institutional, and recreational, and leisure activities",
- Objective 4: "...diverse housing stock ... to enhance opportunities for County Residents to live in proximity to their workplace and/or mass transit",
- Objective 6: "have a land use pattern that increases transportation efficiency, encourages transit use, and decreases automobile dependency"; and

WHEREAS, The Board's recently adopted plan for Environmental Excellence in Fairfax County lists Land Use Goals that incorporate the following Smart Growth Principles on good urban growth and elements of New Urbanism including:

1. Use clustering and mixed-use development when appropriate to utilize space efficiently and provide perpetual open space.
2. Promote walkable communities using mixed-use development and village-style neighborhoods.
3. Maximize mixed-use development near transit stops and expand public transportation to employment centers. Provide convenient transportation choices such as subway, light rail, commuter bus, connector bus, and monorail.
4. Make employment centers, such as Tyson's Corner, self-contained vibrant places to live and work by ensuring mixed-use, pedestrian friendly, transit-oriented development.
5. Use our land and other resources wisely by
 - concentrating employment and multi-family housing near transit services (and by expanding those transit services);
 - integrating pedestrian-oriented neighborhood commerce (markets, restaurants, services) into new residential neighborhoods;
 - providing pedestrian amenities whenever possible, such as sidewalks and trails; traffic calming; street furniture in shopping areas; transit shelters; and urban building design;
 - providing parking incentives for carpoolers; encourage transit use by reducing the use of parking subsidies where appropriate; and

WHEREAS, Population growth and transportation congestion are increasing across the County; and

WHEREAS, The economic growth and vitality of the county will and should continue; and

WHEREAS, Continued growth without including provisions of smart growth principles and elements of New Urbanism with increase transportation congestion and decrease the overall quality of life; and

WHEREAS, The Board of Supervisors recently adopted a Land Use amendment incorporating smart growth and New Urbanism concepts in the Fairlee area, next to the Vienna Metro, that provides mixed use near the Metro station including 2,250 additional housing units, and a Floor Area Ratio (FAR) of 2.25 within ¼ mile of the Metro; and

WHEREAS, The recently adopted Fairlee amendment calls for Transportation Demand Management (TDM) with specific goals to reduce automobile trips (another concept of New Urbanism and smart growth);

THEREFORE, BE IT RESOLVED, That EQAC supports the recent Board of Supervisors amendment at Fairlee and commends the Board for its commitment to the Environmental principles set forth in both the Comprehensive Plan and the Environmental Vision; and

BE IT FURTHER RESOLVED, That EQAC recommends the Board continue to:

1. Apply the objectives defined in the Land Use Section of the Comprehensive Plan and the goals stated in the Fairfax Environmental Excellence Vision; and
2. Encourage land use decisions that foster walkable communities with transportation designs and alternatives that enhance the overall quality of life in Fairfax County.

ENVIRONMENTAL QUALITY ADVISORY COUNCIL

A RESOLUTION ON FAIRFAX COUNTY'S STORMWATER MANAGEMENT PROGRAM AND A PROPOSED STORMWATER UTILITY

March 9, 2005

Whereas, the Fairfax County Board of Supervisors formed the Stormwater Advisory Committee, a citizens committee to address Fairfax County's stormwater program and funding issues; and

Whereas, EQAC was one member of this committee; and

Whereas, the Stormwater Advisory Committee recommendations will be presented to the Board of Supervisors on March 28, 2005; and

Whereas, the Stormwater Advisory Committee reached unanimous agreement on some recommendations: (1) the need for a dedicated source of funding for the stormwater management program and (2) support for the County Executive's proposed dedication of one cent of general revenue that will be added to the normal funding for stormwater management; and

Whereas, the Stormwater Advisory Committee reached agreement to start a stormwater utility in FY2007 with an overwhelming majority; and

Whereas, this same overwhelming majority of the Committee agreed that a portion of the County Executive's stormwater budget proposal for FY2006 be used to do the necessary planning and setup of a stormwater utility so that the stormwater utility starts in FY2007; and

Whereas, the same overwhelming majority of the Committee believes that a stormwater utility is fairer than using the general fund as a source of funding for stormwater management since payment in a utility will be based on impervious surface (the cause of the problem) rather than assessed value of property; and

Whereas, a stormwater utility program supported by a stormwater utility fee also offers credits that will reward and encourage practices that reduce the impact of stormwater runoff;

Therefore be it resolved, that EQAC recommends the following to the Board of Supervisors:

- A dedicated source of funding be established for the stormwater management program;
- The Board of Supervisors adopt the County Executive's proposal for FY2006 that a dedicated one cent from the general fund be added to the normal funding for stormwater management;
- The Board of Supervisors institute a stormwater utility that will start in FY2007 with preparation starting in FY2006

FAIRFAX COUNTY ENVIRONMENTAL QUALITY ADVISORY COUNCIL

March 23, 2005

Board of Supervisors
County of Fairfax
12000 Government Center Parkway
Fairfax, VA 22035

Dear Chairman Connolly and Members of the Board:

On March 9, 2005, the Environmental Quality Advisory Council (EQAC) met with the Fairfax County Park Authority Board for a discussion of the Park Authority's stewardship activities. During the discussion, it was noted by Park Authority staff that they had submitted a funding addendum to the Fiscal Year 2006 budget for \$305,000 in support of natural resource inventory activities and to combat invasive non-native plants; this additional funding was not included in the proposed FY 2006 budget.

These additional funds would allow the Park Authority to begin implementing its recently adopted Natural Resource Management Plan, which supports the Board of Supervisors' Environmental Agenda. EQAC strongly recommends that the Board consider this request of a funding addendum to the FY 2006 budget for the Park Authority.

Sincerely,

[Signed]

Stella Koch, Chairman
Environmental Quality Advisory Council

ENVIRONMENTAL QUALITY ADVISORY COUNCIL

RESOLUTION SUPPORTING THE PRESERVATION OF CONTIGUOUS OPEN SPACE

July 13, 2005

WHEREAS, The Environment Section of the Comprehensive Plan clearly sets forth a goal in support of the preservation of open space stating:

“Fairfax County should support the conservation of appropriate land areas in a natural state to preserve, protect and enhance stream valleys, meadows, woodlands, wetlands, farmland, and plant and animal life. Small areas of open space should also be preserved in already congested and developed areas for passive neighborhood uses, visual relief, scenic value, and screening and buffering purposes”; and

WHEREAS, The Comprehensive Plan recognizes that the amount of open space within the County decreased by over 30% between 1975 and 1995; and

WHEREAS, Development and growth will continue to occur throughout the County; and

WHEREAS, The Comprehensive Plan has recognized the benefit of open space, stating:

"It is desirable to conserve a portion of the County's land in a condition that is as close to a predevelopment state as is practical. A conserved network of different habitats can accommodate the needs of many scarce or sensitive plant and animal species. Natural open space also provides scenic variety within the County, and an attractive setting for and buffer between urban land uses. In addition, natural vegetation and stream valleys have some capacity to reduce air, water and noise pollution"; and

WHEREAS, Large tracts of open space are becoming more scarce with increased development; therefore

BE IT RESOLVED, That EQAC commends the Board of Supervisors for its efforts to preserve open space and for its commitment to the Environmental principles set forth in the Comprehensive Plan; and

BE IT FURTHER RESOLVED, That EQAC recommends the Board to continue to:

1. Pursue the goals set forth in the Environment Section of the Comprehensive Plan;
2. Encourage the preservation of contiguous, un-fragmented natural areas to achieve the greatest benefit from open space in the County, preserving ecological communities in their entirety where it is possible; and
3. Refrain from using natural, open areas that have been designated as parkland for the construction of new roads or utility rights-of-way, thereby preserving natural areas, which are becoming increasingly scarce in the county.

2006 EQAC LEGISLATIVE PROPOSAL—ADOPTED BY EQAC ON AUGUST 10, 2005

GENERAL SUBJECT AREA -- TITLE OF PROPOSAL

NATURAL RESOURCES- FUNDING

PROPOSAL:

Support increased funding for natural resources, including increased funding for the Water Quality Improvement Fund ("WQIF") and the Virginia Land Conservation Fund ("VLCF").

BACKGROUND:

The Virginia constitution makes protection of our natural resources a core function of state government. However, for several years prior to the 2004 General Assembly session, general fund allocations to state agencies responsible for natural resources were dramatically reduced to the point that less than one percent of Virginia's budget was spent on natural resources. Prior to the 2004 legislative session, Virginia ranked 50th in the nation for per capita spending on natural resources.

Virginia is losing its open space, historic sites, forests and farms at an alarming rate. Studies have found that nearly half a million acres of prime Virginia farmland were lost between 1987 and 1997 and an average of 54,000 acres of forestland were lost each year between 1992 and 2000. The VLCF was created to provide matching funds to protect land for conservation purposes. It leverages federal, local and private investment to protect farms, forests, open space, parks, natural areas and historic resources.

According to a study by the Chesapeake Bay Commission, Virginia has grossly inadequate funding to achieve water quality commitments made when it signed the Chesapeake 2000 Agreement. That agreement includes a pledge to conserve 20% of the land in the Chesapeake Bay watershed and to reduce pollutants flowing into the Bay, including a reduction of 26 million pounds of nitrogen pollutants by 2010. The WQIF makes matching grants to finance water quality improvements, including restoration of the Chesapeake Bay and its tributaries.

In 2004, the General Assembly appropriated the first new funding in several years for natural resources. Since 2000, the VLCF and the WQIF had received zero funding. In 2005, the General Assembly increased funding for the WQIF by \$50 Million and for the VLCF by \$10 Million. This one time appropriation for water quality and land conservation, while welcome, is inadequate to meet the enormous long-term needs of the Commonwealth. For example, the Northern Virginia Regional Commission supports a minimum annual state general fund appropriation of \$30 million for the WQIF and minimum annual funding of \$50 million for the VLCF. The Virginia Conservation Network has called for the state to set a goal of 2% of the general fund budget to be appropriated for natural resource funding. To achieve that goal would require an increase of \$90 Million over current funding levels.

POSITION INFORMATION SHEET

EQAC recommends that Fairfax County support increased funding for natural resources generally and for the WQIF and VLCF in particular.

RECOMMENDATION:

POSSIBLE SUPPORT OR OPPOSITION BY ORGANIZATIONS:

Organizations that support increased funding for natural resources include the Virginia Conservation Network, which includes over 100 member organizations, the Sierra Club, the Northern Virginia Regional Commission and the Virginia Association of Counties.

Opposition to increased funding for natural resources could be expected to come from anti-tax groups and advocates of other state programs that compete with natural resource funding for limited state funds.

STAFF CONTACT PERSON(S):

Noel Kaplan
Environment and Development Review Branch
Fairfax County Department of Planning and Zoning
12055 Government Center Parkway, Suite 730
Fairfax, VA 22035

Phone: (703) 324-1210

Fax: [REDACTED]

Email: [REDACTED]

POSITION STATEMENT FORM

2006 EQAC LEGISLATIVE PROPOSAL—ADOPTED BY EQAC ON AUGUST 10, 2005

GENERAL SUBJECT AREA -- TITLE OF PROPOSAL

ZONING- ADEQUATE PUBLIC FACILITIES ORDINANCE

PROPOSAL:

Support legislation to give localities authority to adopt an adequate public facilities ordinance. Legislation should permit localities to adopt provisions in their subdivision ordinances for deferring the approval of subdivision plats or site plans when they determine that existing schools, roads, public safety, sewer or water facilities are inadequate to support the proposed development. The legislation should also provide that an expressed purpose of zoning ordinances is to protect against an undue rate of development in relation to existing or available public facilities. Such legislation should not require the localities to construct the necessary infrastructure within a time frame established by the General Assembly.

BACKGROUND:

In Virginia, local government lacks authority to manage the pace and timing of development that has been approved, even when there are inadequate public facilities to serve the new development. In recent legislative sessions, numerous attempts to authorize adequate public facilities ordinances have not been successful.

The Board of Supervisors' recently enacted Environmental Agenda commits to pursuing "state enabling legislation to ensure adequate infrastructure is in place for new development".

EQAC recommends that Fairfax County support enabling legislation to authorize localities to adopt adequate public facilities ordinances.

RECOMMENDATION:

POSITION INFORMATION SHEET

POSSIBLE SUPPORT OR OPPOSITION BY ORGANIZATIONS:

Members of the Virginia legislature who have sponsored or co-patroned adequate public facilities ordinance authorizing legislation include Senators Chichester, Norment, Houck and Mims and Delegates Sickles, Marshall, William Howell and Orrock.

The Virginia Coalition of High Growth Communities (an organization comprised of at least 25 jurisdictions within Virginia, including Fairfax County) supports authorization for an adequate public facilities ordinance.

Numerous civic and environmental associations are on record supporting adequate public facilities legislation. Some of these organizations include the Virginia Conservation Network, The Virginia Chapter of the Sierra Club, the Virginia Municipal League, and the Virginia Association of Counties.

Opposition will probably come from certain segments of the business community, especially developers. The Fairfax Chamber of Commerce and the Northern Virginia Association of Realtors are on record as opposing adequate public facilities legislation.

STAFF CONTACT PERSON(S):

Noel Kaplan
Environment and Development Review Branch
Fairfax County Department of Planning and Zoning
12055 Government Center Parkway, Suite 730
Fairfax VA 22035

Phone: 703-324-1210

Fax:

Email:

ENVIRONMENTAL QUALITY ADVISORY COUNCIL

RESOLUTION SUPPORTING DPWES TREE PRESERVATION LEGISLATIVE PROPOSAL

September 14, 2005

WHEREAS, the Fairfax County Department of Public Works and Environmental Services has proposed Tree Preservation Legislation for inclusion in the Board of Supervisor's legislative package for the 2006 Virginia legislative session; and,

WHEREAS, the proposed legislation would amend Virginia State Code Section 15.2-961 to enable certain jurisdictions, including Fairfax County, to require the preservation of trees and woodlands when these exist on sites prior to development; and,

WHEREAS, current enabling legislation deals strictly with tree canopy replacement and provides little incentive for tree preservation; and,

WHEREAS, without enabling tree preservation language, the preservation of existing trees and their associated environmental benefits will continue to be overlooked in favor of planting new trees which can take many decades to provide the same level of air and water quality benefits that are provided by existing trees; and,

WHEREAS, the County's objective to preserve existing tree canopy is set forth in the Residential Development Criteria, which provides that all rezoning applications "should be designed to take advantage of the existing quality tree cover"; and,

WHEREAS, the legislative initiative proposed by DPWES is consistent with the policies and objectives set forth in the Board of Supervisors' Environmental Agenda, including the objective of protecting and enhancing the environment; and,

WHEREAS, the legislative initiative proposed by DPWES is consistent with past resolutions adopted by the Environmental Quality Advisory Council.

NOW, THEREFORE, BE IT RESOLVED, That EQAC recommends that the Tree Preservation Legislation proposed by DPWES be included in the Fairfax County 2006 Virginia General Assembly Legislative Program.

Environmental Quality Advisory Council

Resolution regarding Reclassification of Perennial Streams

November 9, 2005

Whereas, practically all streams in Fairfax County have streambeds consisting of a sediment layer comprised of particles ranging in size from silt to coarse gravel and small stones; and

Whereas, these sedimentary streambeds may range from an inch or two up to several feet in thickness, except for those few short stretches where the sediment layer may have been scoured down to a stone bench or the channel armoring layer; and

Whereas, scientific research and engineering studies have shown conclusively that, in addition to the flow of water above the bed, there is continuous flow through these sedimentary streambed layers; and

Whereas, many of these studies have shown that such “through-the-bed flow” persists even when the “above-the-bed flow” is diminished to the point of absence during seasonally dry periods or during drought conditions; and

Whereas, such sediment layers form an important habitat for many invertebrate species and insect larvae and play a much more important role chemically than the “above surface” waters; and

Whereas, it has become apparent that the mere absence of “above-the-bed” water for some portion of the length a stream often gives an erroneous and misleading result if relied upon for classification or reclassification of the stream; and

Whereas, if a stream is perennial above a certain reach and perennial below that same reach, it is a logical impossibility that the reach in question should be deemed intermittent; and

Whereas, in addition to measurements taken in the particular stream reach being considered for reclassification it is essential to check in both the upstream and downstream directions to determine the presence of “above-the-bed flow”, the presence of “through-the-bed flow”, and the flow rates; and

Whereas, federal agencies such as the U.S. Geological Survey, Bureau of Land Management, Corps of Engineers, and Environmental Protection Agency, as well as numerous state and local agencies, use a variety of proven techniques, such as dye injection tests, isotope tests, bore holes, and piezometry (a testing procedure) to determine flow through sedimentary streambeds; and

Whereas, Fairfax County has developed a generally excellent protocol, which utilizes 26 factors in order to determine an initial classification for a stream, but which contains no criterion for evaluation of “through-the-bed flow” in the streambed; and

Whereas, the Chesapeake Bay Preservation Ordinance (CBPO) and Public Facilities Manual (PFM) presently rely only on a visual observation of absence of “above-the-bed flow” as the basis for changing the stream classification from perennial to intermittent; and

Whereas, the County staff has drafted language that would correct this deficiency in the procedures for reclassification of streams; and

Whereas, the County staff has proposed detailed requirements for notifying nearby neighbors of any proposed reclassification study; now therefore

Be it resolved, that the CBPO and the PFM be modified to include a provision that reclassification of a stream or any portion thereof, where “above-the-bed flow” is not apparent, shall require determination by County staff of the presence or absence of dynamic pools of water in the sedimentary bed, or the presence of water at the true channel bottom which is located below the moveable bed load at the top of the channel armoring layer, and where either determination finds water present, that shall be regarded as conclusive proof of perenniality; and

Be it further resolved, that the above determination may include, if required, physical tests such as dye injection, isotope migration, bore holes, piezometry or other standard methods to determine “through-the-bed flow/flow rate;” and

Be it further resolved, that any stream reach being considered for reclassification shall have the “above-the-bed flows,” “through-the-bed flows,” presence of dynamic pools, and presence of water at channel bottom determined upstream to the beginning of perenniality as shown on the adopted maps and downstream for 150 feet from the reach in question; and

Be it finally resolved, that the notification of nearby neighbors of the proposed reclassification, as has been proposed by the County staff, be incorporated in the CBPO and the PFM, as appropriate.

APPENDIX B

FAIRFAX COUNTY ENVIRONMENTAL EXCELLENCE AWARDS

The Fairfax County Environmental Excellence Awards have been established to recognize County residents, organizations, businesses, and County employees who unselfishly dedicate time, energy, and expertise for the betterment of the environment in support of countywide environmental goals and initiatives. Award recipients are selected by the Environmental Quality Advisory Council, and the awards are presented each fall during a meeting of the Fairfax County Board of Supervisors.

The recipient of the 2005 Environmental Excellence Awards was:

County Employee Award:	Janet Rahman
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Janet Rahman is a 20-year employee with the Administrative Branch of the Fairfax County Park Authority. She has been recognized for her extraordinary personal commitment, dedication, and inspiration in the promotion of waste reduction, reuse, and recycling. EQAC congratulates Ms. Rahman for her achievements.

In past years, Environmental Excellence Awards have been awarded to the following people and organizations:

2004

County Resident Award:	Ned Foster
Organization Award:	Reston Association

2003

County Resident Award:	Joseph Chudzik
Organization Award:	Students Against Global Abuse (SAGA)
County Employee Award:	Noel Kaplan

2002

County Resident Award:	Charlie Creighton
Organization Award:	Hickory Farms Community Association

2001

County Resident Award:	Chris Koerner
Organization Award:	Bailey's Beautification Alliance

2000

County Resident Award:	Norma Hoffman
Organization Award:	Friends of Sugarland Run
County Government Employee Award:	Gary Roisum

The nomination period for the Environmental Excellence Awards occurs during the spring of each year. EQAC encourages interested individuals, organizations, County employees, and businesses to submit nominations.

APPENDIX C

ACRONYMS AND ABBREVIATIONS USED WITHIN THE ANNUAL REPORT

°C	Degrees Centigrade
A&F	Agricultural and Forestal
ACM	Assessment of Corrective Measures
ANS	Audubon Naturalist Society
APHIS	Animal Plant Health Inspection Service (federal)
API	American Petroleum Institute
APR	Area Plans Review
AQS	Air Quality Subcommittee (county)
ARD	America Recycles Day
B4B	Businesses for the Bay
BMP	Best Management Practice
BOD	Biochemical Oxygen Demand
BOS	Board of Supervisors (county)
Bt	Bacillus thuringiensis
BWI	Baltimore-Washington International Airport
CAA	Clean Air Act (federal)
CAIR	Clean Air Interstate Rule (federal)
CAP	Corrective Action Plan
CBC	Commercial business center
CBLA	Division of Chesapeake Bay Local Assistance (formerly CBLAD) (state)
CBLAB	Chesapeake Bay Local Assistance Board (state)
CBLAD	Chesapeake Bay Local Assistance Department (now CBLA) (state)
CBOD ₅	Chemical and Biological Oxygen Demand (5-day test)
CBP	Chesapeake Bay Program (regional)
CCR	Consumer Confidence Report
CCT	Cross-County Trail
CDC	Centers for Disease Control (federal)
CDD	Construction/Demolition/Debris
CDF	Citizens' Disposal Facility
CDM	Camp, Dresser and McKee
CEMS	Continuous Emissions Monitoring System
CESQG	Conditionally Exempt Small Quantity Generator
CFI	Covanta Fairfax, Inc.
CIP	Capital Improvement Program

CLRP	Constrained Long Range Plan (regional)
CO	Carbon Monoxide
CO₂	Carbon Dioxide
COG	Metropolitan Washington Council of Governments (regional-Also cited as MWCOG)
CONAANDA	Committee on Noise Abatement and Aviation at National and Dulles Airports (regional)
CO-OP	Cooperative Water Supply Operations
CTB	Commonwealth Transportation Board (state)
CY	Calendar Year
D.O./DO	Dissolved Oxygen
D/DB-P	Disinfectant/Disinfection By-products
dB	Decibel
dBA	Decibel (A-weighted level scale)
DC	District of Columbia
DCR	Department of Conservation and Recreation (state)
DEQ	Department of Environmental Quality (state)
DEET	N,N-diethyl-meta-toluamide
DEIS	Draft Environmental Impact Statement
DGIF	Department of Game and Inland Fisheries (state)
DNA	Deoxyribonucleic Acid
DNL	Day-Night Noise Level
DNR	Department of Natural Resources (Maryland)
DPWES	Department of Public Works and Environmental Services (county)
DPZ	Department of Planning and Zoning (county)
dscm	Dry standard cubic meter
DSWC&R	Division of Solid Waste Collection and Recycling (county)
DSWDRR	Division of Solid Waste Disposal and Resource Recovery (county)
DU/AC	Dwelling Units per Acre
E&S	Erosion and Sediment
E/RRF	Energy/Resource Recovery Facility
ECC	Environmental Coordinating Committee (county)
EFID	Environmental and Facilities Inspection Division (county)
EFRD	Environmental and Facilities Review Division (county)
EHD	Epizootic hemorrhagic disease
EIS	Environmental Impact Statement
EMS	Environmental Management System
EPA	Environmental Protection Agency (federal)
EPCRA	Emergency Planning and Community Right-to-Know Act (federal)
EQ	Exceptional Quality (biosolids)

EQAC	Environmental Quality Advisory Council (county)
EQC	Environmental Quality Corridor
ERC	Employee Recycling Committee (county)
ERICA	Employee Recycling Committee Recycler of the Year Award (county)
ESP	Employer Services Program (county)
ESWTR	Enhanced Surface Water Treatment Rule
FAA	Federal Aviation Administration
FAR	Floor Area Ratio
FCDOT	Fairfax County Department of Transportation
FCPA	Fairfax County Park Authority
FCPD	Fairfax County Police Department
FCPS	Fairfax County Public Schools
FCS	Forest Conservation Section (county)
FCWA	Fairfax County Water Authority (now Fairfax Water)
FHWA	Federal Highway Administration
FJLEPC	Fairfax Joint Local Emergency Planning Committee (regional)
FPP	Forest Pest Program (county)
FTE	Full time employee
FW	Fairfax Water (formerly the Fairfax County Water Authority)
FY	Fiscal Year
GAC	Granular Activated Carbon
GAT	Guaranteed Annual Tonnage
GIS	Geographic Information System
GPS	Groundwater Protection Standards
HAA	Haloacetic Acid
HAZMAT	Hazardous Materials
HB	House Bill (state)
HCl	Hydrochloric Acid
Hg	Mercury
HHW	Household Hazardous Waste
HOA	Homeowners Association
HOT	High Occupancy Toll
HOV	High Occupancy Vehicle
IAQC	Interstate Air Quality Council (regional)
ICPRB	Interstate Commission on the Potomac River Basin (regional)
IESNA	Illuminating Engineering Society of North America
IPM	Integrated Pest Management
KAP	Knowledge, Attitudes, and Practices
LCAT	Lorton Citizens Alliance Team

LDS	Land Development Services function of the Department of Public Works and Environmental Services (county)
LEPC	Local Emergency Planning Committee
LID	Low Impact Development
Li-ion	Lithium Ion
LOS	Level of Service
LOWESS	Locally weighted sum of squares
MCL	Maximum Contaminant Level
MCS	Michigan Cogeneration Systems
MD	Maryland
mg	Milligram
mg/l	Milligrams per liter
mgd	Million gallons per day
ml	Milliliter
MLC	McLean Land Conservancy
MOU	Memorandum of Understanding
MPO	Metropolitan Planning Organization
MRDL	Maximum Residual Disinfectant Level
MRF	Material Recovery Facility
MS4	Municipal Separate Storm Sewer System
MSW	Municipal Solid Waste
MtBE	Methyl tertiary butyl ether
MWAA	Metropolitan Washington Airports Authority (regional)
MWAQC	Metropolitan Washington Air Quality Committee (regional)
MWCOG	Metropolitan Washington Council of Governments (regional – also cited as COG)
NAAQS	National Ambient Air Quality Standards
NAIOP	National Association of Industrial and Office Properties
NASIS	National Soils Information System
NEPA	National Environmental Policy Act
ng	Nanogram
NiCad	Nickel-Cadmium
Ni-MH	Nickel Metal Hydride
NMCPCP	Noman M. Cole, Jr. Pollution Control Plant (county)
NMTC	Non-Motorized Transportation (Trails) Committee (county)
NOV	Notice of Violation
NOx	Oxides of Nitrogen
NPDES	National Pollutant Discharge Elimination System
NPS	Nonpoint Sources
NRCS	Natural Resources Conservation Service

NRMP	Natural Resource Management Plan
NSR	New Source Review
NTU	Nephelometric Turbidity Units
NVAR	Northern Virginia Association of Realtors
NVBIA	Northern Virginia Building Industry Association
NVCS	National Vegetation Classification System
NVCT	Northern Virginia Conservation Trust
NVRC	Northern Virginia Regional Commission (regional—formerly NVPDC—the Northern Virginia Planning District Commission)
NVRPA	Northern Virginia Regional Park Authority
NVSR	Northern Virginia Stream Restoration, L.C.
NVSWCD	Northern Virginia Soil and Water Conservation District (regional)
NWR	National Wildlife Refuge
OAR	Opportunities, Alternatives and Resources
OBM	Optical Brighteners Monitoring
OEM	Office of Emergency Management (county)
OWML	Occoquan Watershed Monitoring Laboratory
OWMP	Occoquan Watershed Monitoring Program
Pb	Lead
PCB	Polychlorinated Biphenyls
PFM	Public Facilities Manual (county)
PLUS	Planning Land Use System
PM	Particulate Matter
PM_{2.5}	Particulate Matter less than 2.5 microns in diameter
pph	Pounds per hour
ppm	Parts per million
PRM	Principal Recyclable Material
QA/QC	Quality Assurance/Quality Control
RA	Reston Association
RACM	Reasonably Available Control Measures
RBRC	Rechargeable Battery Recycling Corporation
RDOC	Recycling Drop Off Center
ROP	Rate of Progress
RPA	Resource Protection Area
SAGA	Students Against Global Abuse
SARA	Superfund Amendments and Reauthorization Act of 1986 (federal)
SAV	Submerged Aquatic Vegetation
SDWA	Safe Drinking Water Act (federal)
SIP	State Implementation Plan
SJ	Senate Joint Resolution (state)
SMCL	Secondary Maximum Contaminant Level
SNAP	State Noise Abatement Policy

SO₂	Sulfur Dioxide
SOCs	Synthetic Organic Compounds
SPS	Stream Protection Strategy
SUAG	Stormwater Utility Advisory Group (county)
SUV	Sport Utility Vehicle
SWM	Solid Waste Management
SWMP	Solid Waste Management Plan (county)
SWPD	Stormwater Planning Division (county)
SWTF	Solid Waste Task Force (county)
TAC	Technical Advisory Committee to MWAQC (regional)
TCC	Transportation Coordinating Council (regional)
TDM	Transportation Demand Management
THM	Trihalomethanes
TIP	Transportation Improvement Program
TMDL	Total Maximum Daily Load
TOD	Transit Oriented Development (or Design)
TPB	Transportation Planning Board (regional)
TPTF	Tree Preservation Task Force (county)
TSS	Total Suspended Solids
TTHM	Total Trihalomethanes
UDIS	Urban Development Information System
UFM	Urban Forest Management (county)
µg/l	Microgram Per Liter
UOSA	Upper Occoquan Sewage Authority
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
VA	Virginia
V/C	Volume to Capacity Ratio
VDACS	Virginia Department of Agriculture and Consumer Services
VDEQ	Virginia Department of Environmental Quality
VDGIF	Virginia Department of Game and Inland Fisheries
VDH	Virginia Department of Health
VDOF	Virginia Department of Forestry
VDOT	Virginia Department of Transportation
VEPGA	Virginia Energy Purchasing Governmental Association
VIMS	Virginia Institute of Marine Science
VMRC	Virginia Marine Resources Commission
VOC	Volatile Organic Compound
VOLT	Virginia Outdoor Lighting Task Force
VPDES	Virginia Pollutant Discharge Elimination System
VRE	Virginia Railway Express

VSS	Volatile Suspended Solids
W&OD	Washington and Old Dominion
WACOT	Washington Area Conference on Telework
WID	Watershed Improvement District
WMATA	Washington Metropolitan Area Transit Authority (regional)
WWTP	Wastewater Treatment Plant